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Science-fiction

DECEMBER, 1945

25 CENTS

BEGGARS IN VELVET

BY LEWIS PADGETT

KNOW THIS EMBLEM ...
THE DISCHARGED
VETERAN WEARS
THIS AS HE WORE
HIS UNIFORM ...
WITH HONOR!

Get after Infectious Dandruff with LISTERINE ANTISEPTIC NOW!



Quick Germicidal Action Kills the "Bottle Bacillus" by millions, and Helps to Restore Scalp to Normal Condition.

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They can be evidence that a case of infectious dandruff is getting started and may be well on its way.

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LAMBERT PHARMACEUTICAL CO., St. Louis, Mo.



The TREATMENT

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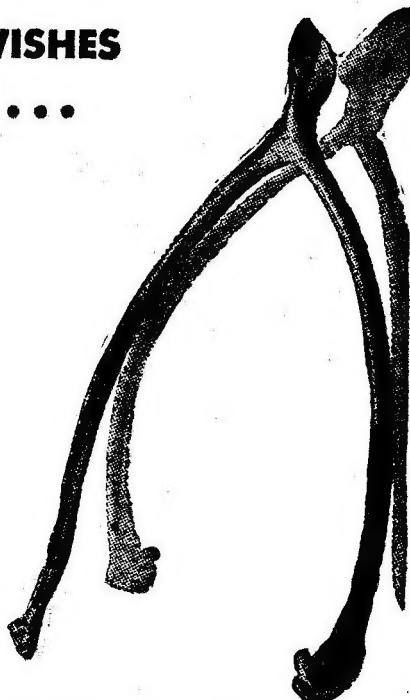
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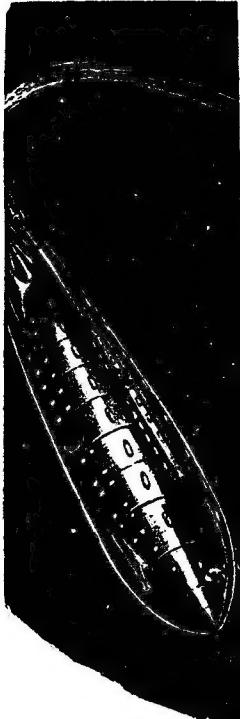
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SCIENCE FICTION

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Editor
JOHN W. CAMPBELL, JR.

Atoms Won't Do Everything

There's a rather wild rash of speculation on the atomic age in nearly all the magazines now. It's due to a rather curious situation, wherein practically no one who hasn't read science-fiction for the last ten years has any really long-term considered ideas on the subject. Since the science-fictioneers have, by the nature of the medium, covered very long periods of time on a rather vaguely undeclared time-scale, the relative periods during which different phases of atomic equipment might become available remains decidedly obscure.

Let's try to figure out *what* atomic power can do and *when* the device involved might become available at *how much* cost.

To begin with, size has very peculiar effects in atomic considerations. Practically any ordinary-sized lump of matter contains, to all practical purposes, an infinite number of atoms. At any rate, the number is so high as to make the laws of statistical mechanics on which atomic reactions depend perfectly applicable. Therefore, generally speaking, any ordinary sized lump of matter is going to behave approximately as an infinite mass of that matter would.

There are two types of exceptions to this. When the atomic reaction involves a chain reaction, the high velocity atomic particles must be utilized, and, since those enormously fast-moving particles can travel considerable distances before

being absorbed, the mass involved must be larger than the average range of penetration of the released particles. The critical-mass effect, by which the atomic bomb is detonated, depends on that factor. But, once the critical mass is exceeded, all larger masses do precisely the same thing—but more heartily.

The other type of exception is a variant of this one really; in the uranium pile, the high-speed neutrons must be withdrawn from the mixture of uranium isotopes, slowed to thermal speed, and only then returned to the mixture. The reason is that at twenty-five-volt energies, the neutrons would be absorbed in U-238 without producing fission; they must be slowed to five volts or less before reacting with U-235. In slowing from the high speeds of the newly-ejected neutrons to the five-volt speed, the speed must at some point pass through the twenty-five-volt range. If the slowing takes place in uranium, the neutrons would be absorbed without aiding the continuation of the fission process. For this reason, the fast neutrons must be withdrawn from the uranium, slowed to five-volt speeds, and then returned. This is effected by the use of small lumps of uranium scattered through large blocks of neutron-slowing, nonabsorbing graphite. This combination has very definite size effects; if the pile isn't large enough, the escape of neutrons from its surfaces exceeds produc-

tion, and the reaction halts.

We have the atomic bomb. Theoretically at least, we can use the atomic pile as a source of heat and power—particularly if, instead of graphite, we use heavy-water as the neutron-slower. The heavy-water could be used as the boiler water to drive a turbine. The use of heavy water makes for a much more compact pile, and a more efficient one, since heavy hydrogen slows neutrons more quickly than the more massive graphite atoms.

But whether you use graphite or water, the operation of a uranium pile is attended by the most violent sort of gamma radiation, and quantities of virulently poisonous radioactive elements are produced. The whole pile must be shielded in massive ray-absorbing shielding, and neutron-absorbing back-up layers beyond that. Since the smallest pile is *large*—an experimental pile, too small to be self-maintaining was set up at Columbia; it was an eight-foot cube, and contained six tons of uranium—the pile method of developing power isn't practicable for any small-scale power applications. A somewhat smaller pile could be used if purified U-235 were used instead of the mixed isotopes of natural uranium—but if the pile is too small, the uncontrollable fast-neutron reaction of the atomic bomb might take over, instead of the reliable, controllable slow-neutron reaction. The neutrons must be slowed between uranium lumps, and that takes distance.

So uranium piles could be used for powering fixed power plants

supplying large cities and metropolitan areas. They will be expensive, probably more expensive than coal plants of equal installed generation capacity. The fuel however will probably have the unique distinction of being more valuable as an ash than as a fuel! For the big, fixed power installations will not use purified and separated U-235 or the equally vigorous plutonium as fuel; they'll use the natural uranium isotopes, and pass on their burned-down uranium slugs to extraction plants which can extract the even more valuable plutonium, and return the still-unused portion of the uranium. The fixed plants will be able to serve as power-generators and as plutonium producers.

The plutonium and to a lesser extent, probably, "enriched uranium," containing an artificially increased percentage of U-235, will be used for mobile power installations, where smaller, less massive pile structures are desirable. The mobile installations will be mobile only in the sense that the Army and Navy uses the term. The Army classifies anything which can be moved in a fleet of trucks as "mobile," the Navy produces high mobility in fifty-thousand-ton battle-wagons. Uranium pile power may well be available in large ships—ten thousand tons and larger—and possibly in locomotives. At some time in the not-immediate future, gigantic aircraft, capable of carrying a one hundred-ton burden of power plant, might be developed to use uranium pile power.

THE EDITOR.

Beggars In Velvet

by LEWIS PADGETT



The Baldies lived always in the shadow of danger; mutations such as they were naturally hated by the normal humans—and to make matters worse, the paranoid members of their own type were on the warpath! And no one could know when they would be betrayed—

Illustrated by Orban

I.

It was like stepping on a snake. The thing, concealed in fresh, green grass, squirmed underfoot and turned and struck venomously. But the thought was not that of reptile or beast; only man was capable of the malignance that was, really, a perversion of intellect.

Burkhalter's dark face did not change; his easy stride did not alter.

But his mind had instantly drawn back from that blind malevolence, alert and ready, while all through the village Baldies paused imperceptibly in their work or conversation as their minds touched Burkhalter's.

No human noticed.

Under bright morning sunlight Redwood Street curved cheerful and friendly before Burkhalter. But

a breath of uneasiness slipped along it, the same cool, dangerous wind that had been blowing for days through the thoughts of every telepath in Sequoia. Ahead were a few early shoppers, some children on their way to school, a group gathered outside the barber shop, one of the doctors from the hospital.

Where is he?

The answer came swiftly. *Can't locate him. Near you, though—*

Someone—a woman, the overtones of her thought showed—sent a message tinged with emotional confusion, almost hysterical. *One of the patients from the hospital—*

Instantly the thoughts of the others closed reassuringly around her, warm with friendliness and comfort. Even Burkhalter took time to send a clear thought of unity. He recognized among the others the cool, competent personality of Duke Heath, the Baldy priest-medic, with its subtle psychological shadings that only another telepath could sense.

It's Selfridge, Heath told the woman, while the other Baldies listened. He's just drunk. I think I'm nearest, Burkhalter. I'm coming.

A helicopter curved overhead, its freight-gliders swinging behind it, stabilized by their gyroscopes. It swept over the western ridge and was gone toward the Pacific. As its humming died, Burkhalter could hear the muffled roar of the cataract up the valley. He was vividly conscious of the waterfall's feathery whiteness plunging down the cliff, of the slopes of pine and fir and

redwood around Sequoia, of the distant noise of the cellulose mills. He focused on these clean, familiar things to shut out the sickly foulness that blew from Selfridge's mind to his own. Sensibility and sensitivity had gone hand in hand with the Baldies, and Burkhalter had wondered more than once how Duke Heath managed to maintain his balance in view of the man's work among the psychiatric patients at the hospital. The race of Baldies had come too soon; they were not aggressive; but race-survival depended on competition.

He's in the tavern, a woman's thought said. Burkhalter automatically jerked away from the message; he knew the mind from which it came. Logic told him instantly that the source didn't matter—in this instance, Barbara Pell was a paranoid; therefore an enemy. But both paranoid and Baldies were desperately anxious to avoid any open break. Though their ultimate goals lay worlds apart, yet their paths sometimes paralleled.

But already it was too late. Fred Selfridge came out of the tavern, blinked against the sunlight, and saw Burkhalter. The trader's thin, hollow-cheeked face twisted into a sour grin. The blurred malignance of his thought drove before him as he walked toward Burkhalter, and one hand kept making little darts toward the misericordia swung at his belt.

He stopped before Burkhalter, blocking the Baldy's progress. His grin broadened.

Burkhalter had paused. A dry

panic tightened his throat. He was afraid, not for himself, but for his race, and every Baldy in Sequoia knew that—and watched.

He said "Morning, Fred."

Selfridge hadn't shaved that morning. Now he rubbed his stubbled chin and let his eyelids droop. "Mr. Burkhalter," he said. "Consul Burkhalter. Good thing you remembered to wear a cap this morning. Skinheads catch cold pretty easy."

Play for time, Duke Heath ordered. I'm coming. I'll fix it.

"I didn't pull any wires to get this job, Fred," Burkhalter said. "The Towns made me consul. Why blame me for it?"

"You pulled wires, all right," Selfridge said. "I know graft when I see it. You were a school-teacher from Modoc or some hick town. What the devil do you know about Hedgehounds?"

"Not as much as you do," Burkhalter admitted. "You've had the experience."

"Sure. Sure I have. So they take a half-baked teacher and make him consul to the Hedgehounds. A greenhorn who doesn't even know those bichos have got cannibal tribes. I traded with the woods-men for thirty years, and I know how to handle 'em. Are you going to read 'em pretty little stories out of books?"

"I'll do what I'm told. I'm not the boss."

"No. But maybe your friends are. Connections! If I'd had the same connections you've got, I'd be sitting on my tail like you, pulling

in credits for the same work. Only I'd do that work better—a lot better."

"I'm not interfering with your business," Burkhalter said. "You've still trading, aren't you? I'm minding my own affairs."

"Are you? How do I know what you tell the Hedgehounds?"

"My records are open to anybody."

"Yeah?"

"Sure. My job's just to promote peaceful relations with the Hedgehounds. Not to do any trading, except what *they* want—and then I refer 'em to you."

"It sounds fine," Selfridge said. "Except for one thing. You can read my mind and tell the Hedgehounds all about my private business."

Burkhalter's guard slipped; he couldn't have helped it. He had stood the man's mental nearness as long as he could, though it was like breathing foul air. "Afraid of that?" he asked, and regretted the words instantly. The voices in his mind cried: *Careful!*

Selfridge flushed. "So you do it after all, eh? All that fine talk about you skinheads respecting people's privacy—sure! No wonder you got the consulate! Reading minds—"

"Hold on," Burkhalter said. "I've never read a non-Baldy's mind in my life. That's the truth."

"Is it?" the trader sneered. "How the devil do I know if you're lying? But you can look inside my head and see if *I'm* telling the truth. What you Baldies need is to be

taught your place, and for two coins I'd—"

Burkhalter's mouth felt stiff. "I don't duel" he said, with an effort. "I won't duel."

"Yellow," Selfridge said, and waited, his hand hovering over the misericordia's hilt.

And there was the usual quandary. No telepath could possibly lose a duel with a non-Baldy, unless he wanted to commit suicide. But he dared not win, either. The Baldies baked their own humble pie; a minority that lives on sufferance must not reveal its superiority, or it won't survive. One such incident might have breached the dyke the telepaths had painfully erected against the rising tide of intolerance.

For the dyke was too long. It embraced all of mankind. And it was impossible to watch every inch of that incredible levee of custom, orientation and propaganda, though the basic tenets were instilled in each Baldy from infancy. Some day the dyke would collapse, but each hour of postponement meant the gathering of a little more strength—

Duke Heath's voice said "A guy like you, Selfridge, would be better off dead."

Sudden shock touched Burkhalter. He shifted his gaze to the priest-medic, remembering the subtle tension he had recently sensed under Heath's deep calm, and wondering if this was the blowoff. Then he caught the thought in Heath's mind and relaxed, though warily.

Beside the Baldy was Ralph Selfridge, a smaller, slighter edition of

Fred. He was smiling rather sheepishly.

Fred Selfridge showed his teeth. "Listen, Heath," he snapped. "Don't try to stand on your position. You haven't got one. You're a surrogate. No skinhead can be a real priest *or* a medic."

"Sure they can," Heath said. "But they don't." His round, youthful face twisted into a scowl. "Listen to me—"

"I'm not listening to—" "Shut up!"

Selfridge gasped in surprise. He was caught flat-footed, undecided whether to use his misericordia or his fists, and while he hesitated, Heath went on angrily.

"I said you'd be better off dead and I meant it! This kid brother of yours thinks you're such a hot-shot he imitates everything you do. Now look at him! If the epidemic hits Sequoia, he won't have enough resistance to work up antibodies, and the young idiot won't let me give him preventive shots. I suppose he thinks he can live on whiskey like you!"

Fred Selfridge frowned at Heath, stared at his younger brother, and looked back at the priest-medic. He shook his head, trying to clear it.

"Leave Ralph alone. He's all right."

"Well, start saving for his funeral expenses," Heath said callously. "As a surrogate medic, I'll make a prognosis right now—*rigor mortis*."

Selfridge licked his lips. "Wait a minute. The kid isn't sick, is he?"

"There's an epidemic down toward Columbia Crossing," Heath said. "One of the new virus mutations. If it hits us here, there'll be trouble. It's a bit like tetanus, but avertin's no good. Once the nerve centers are hit, nothing can be done. Preventive shots will help a lot, especially when a man's got the susceptible blood-type—as Ralph has."

Burkhalter caught a command from Heath's mind.

"You could use some shots yourself, Fred," the priest-medic went on. "Still, your blood type is B, isn't it? And you're tough enough to throw off an infection. This virus is something new, a mutation of the old flu bug—"

He went on. Across the street someone called Burkhalter's name, and the consul slipped away, unnoticed except for a parting glare from Selfridge.

A slim, red-haired girl was waiting under a tree at the corner. Burkhalter grimaced inwardly as he saw he could not avoid her. He was never quite able to control the turmoil of feeling which the very sight or thought of Barbara Pell stirred up within him. He met her bright narrow eyes, full of pin-points of light. He saw her round slimness that looked so soft and would, he thought, be as hard to the touch as her mind was hard to the thought's touch. Her bright red wig, almost too luxuriant, spilled heavy curls down about the square, alert face to move like red Medusa-locks upon her shoulders when she

turned her head. Curiously, she had a redhead's typical face, high-cheekboned, dangerously alive. There is a quality of the red-haired that goes deeper than the hair, for Barbara Pell had, of course, been born as hairless as any Baldy.

"You're a fool," she said softly as he came up beside her. "Why don't you get rid of Selfridge?"

Burkhalter shook his head. "No. And don't you try anything."

"I tipped you off that he was in the tavern. And I got here before anybody else, except Heath. If we could work together—"

"We can't."

"Dozens of times we've saved you traitors," the woman said bitterly. "Will you wait until the humans stamp out your lives—"

Burkhalter walked past her and turned toward the pathway that climbed the steep ascent leading out of Sequoia. He was vividly aware of Barbara Pell looking after him. He could see her as clearly as if he had eyes in the back of his head, her bright, dangerous face, her beautiful body, her bright, beautiful, insane thoughts—

For behind all their hatefulness, the paranoid's vision was as beautiful and tempting as the beauty of Barbara Pell. Perilously tempting. A free world, where Baldies could walk and live and think in safety, no longer bending the scope of their minds into artificial, cramping limits as once men bent their backs in subservience to their masters. A bent back is a humiliating thing, but even a serf's mind is free to range. To cramp the mind is to

cramp the soul, and no humiliation could surpass the humiliation of that.

But there was no such world as the paranoids dreamed of. The price would be too high. What shall it profit a man, thought Burkhalter wryly, if he gain the whole world and lose his own soul? The words might first have been spoken in this connection and no other, so perfectly did they apply to it. The price must be murder, and whoever paid that price would automatically sully the world he bought with it until, if he were a normal creature, he could never enjoy what he had paid so high to earn. Burkhalter called up a bit of verse into his mind and savored again the bitter melancholy of the poet who wrote it, perhaps more completely than the poet himself ever dreamed.

*I see the country, far away,
Where I shall never stand.
The heart goes where no foot-
step may,
Into the promised land.*

Barbara Pell's mind shot after him an angry, evil shaft of scorn and hatred. "You're a fool, you're all fools you don't deserve telepathy if you degrade it. If you'd only join us in—" The thought ceased to be articulate and ran suddenly, gloatingly red with spilled blood, reeking saltily of it, as if her whole mind bathed deliciously in the blood of all humans.

Burkhalter jerked his thoughts away from contact with hers, sickened. It isn't the end of free living

they want any more, he told himself in sudden realization—it's the means they're lustng after now. They've lost sight of a free world. All they want is killing.

"Fool, fool, fool!" Barbara Pell's thoughts screamed after him. "Wait and see! Wait until—one times two is two, two times two is four three times two—"

Burkhalter thought grimly, "They're up to something," and sent his mind probing gingerly past the sudden artificial barrier with which she had sought to blank out a thought even she realized was indiscreet. She fought the probing viciously. He sensed only vague, bloody visions stirring behind the barrier. They she laughed without a sound and hurled a clear, terrible, paranoid thought at him, a picture of sickening clarity that all but splashed in his face with its overrunning redness.

He drew his mind back with swiftness that was pure reflex. As safe to touch fire as thoughts like hers. It was the one way any paranoid could shut out the inquisitive thoughts of a nonparanoid when need arose. And of course, normally no Baldy would dream of probing uninvited into another mind. Burkhalter shuddered.

They were up to something, certainly. He must pass the episode on to those whose business it was to know about the paranoids. Barbara Pell's mind was not, in any case, likely to yield much information on secret plans. She was an executioner, not a planner. He withdrew his thoughts from her,

fastidiously, shaking off the contamination as a cat shakes water from its feet.

He climbed the steep slope that led out of Sequoia to his home, deliberately shutting his mind from all things behind him. Fifteen minutes' walk brought him to the rustic log-and-plastic house built near the shadow of the West Canadian Forest. This was his consulate, and only the cabin of the Selfridge brothers lay farther out in the wilderness that stretched north to the Beaufort Sea that mingles with the Arctic Ocean.

By his desk a glowing red light indicated a message in the terminal of the pneumatic that stretched for six miles into the forest. He read it carefully. A delegation of Hedgehounds would arrive soon, representatives from three tribal groups. Well—

He checked supplies, televised the general store, and sat down behind his desk to wait. Heath would be along soon. Meanwhile he closed his eyes and concentrated on the fresh smell of pine that blew through the open windows. But the fresh, clean scent was sullied by vagrant thought currents that tainted the air.

Burkhalter shivered.

II.

Sequoia lay near the border of old Canada, now an immense wilderness that the forest had largely reclaimed. Cellulose by-products were its industry, and there was an immense psychiatric hospital, which

accounted for the high percentage of Baldies in the village. Otherwise Sequoia was distinguished from the hundreds of thousands of other towns that dotted America by the recent establishment of a diplomatic station there, the consulate that would be a means of official contact with the wandering tribes that retreated into the forests as civilization encroached. It was a valley town, bordered by steep slopes, with their enormous conifers and the white-water cataracts racing down from snowy summits. Not far westward, beyond the Strait of Georgia and Vancouver Island, lay the Pacific. But there were few highways; transport was aerial. And communication was chiefly by teleradio.

Four hundred people, more or less, lived in Sequoia, a tight little semi-independent settlement, bartering its specialized products for shrimps and pompano from Lafitte; books from Modoc; beryllium-steel daggers and motor-plows from American Gun; clothing from Dempsey and Gee Eye. The Boston Textile mills were gone with Boston; that smoking, gray desolation had not changed since 1950, the year of the Blowup. But there was still plenty of room in America, no matter how much the population might increase; war had thinned the population. And as technology advanced so did improvements in reclamation of arid and unfertile land, and the hardier strains of the kudzu plant had already opened vast new tracts for farming. But agriculture was not the only industry.

The towns specialized, never expanding into cities, but sending out spores that would grow into new villages—or, rather, reaching out like raspberry canes, to take root whenever they touched earth.

But each town was independent. No empire could grow. Decentralization had been the answer to the atomic bombs that were so easy to make, and of which each village had its cache. One helicopter could dust off a town, quite conclusively, but it had been decades since such a thing had happened. The psychology was simple and ruthlessly accurate. If one man has a sword, his opponent won't provoke a fight. Not until he has a pistol, and is better armed.

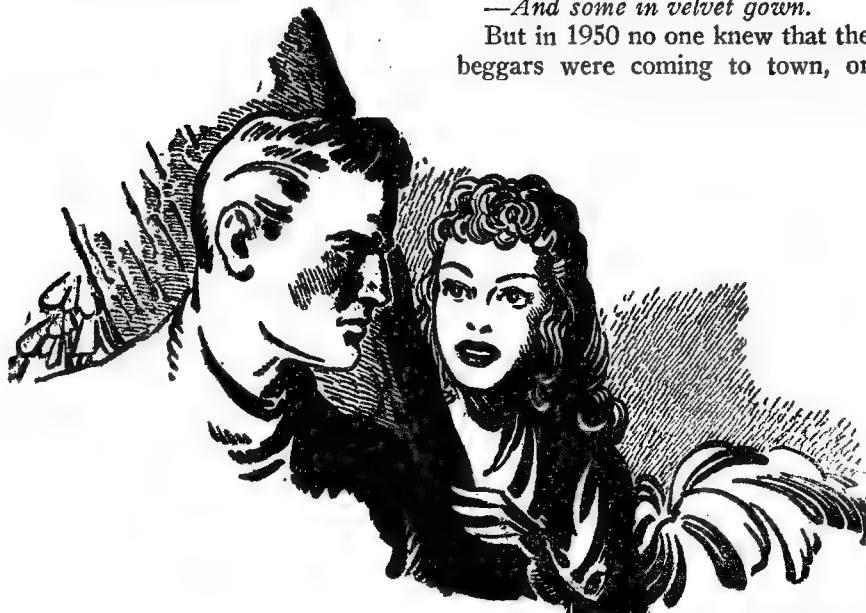
But atomic bombs were the ultimate development. Modoc could dust off Lafitte—but then American

Gun could dust off Modoc. And there was no defense possible.

But the towns spread, cell by cell. Only the blasted areas were shunned, the desolation that had been New York and Chicago and a hundred other cities, the lifeless wastes that held only abnormal life. After the Blowup, the fringes of the radioactive areas had caused the mutations of which the telepaths were the only survivors, aside from the occasional monsters—reptiles and harmless beasts—that still lived near the blasted areas. Until lately, there had been human monsters as well, unsuccessful mutations warped physically or mentally by the radiations. But they had died out by now. Only the telepaths had bred true, and even there existed a cleavage; true Bald, and antisocial paranoid-type.

—And some in velvet gown.

But in 1950 no one knew that the beggars were coming to town, or



that the Baldies' only chance for survival would lie in making themselves the equivalent of Franciscan friars. They were the minority. And minorities can easily arouse hatred, especially when it possesses the incalculable wealth of the telepathic function. From generation to generation of Baldies now the indoctrination had gone on: Seek no power. Let no nontelepath envy you. *No direct competition.*

They worked, had economic security, possessed the luxuries that every other man and woman in America owned. But their heritage was a menace as well as the greatest privilege any race on Earth has ever known.

They were beggars in velvet. And each Baldy knew that, inevitably, the day of the pogrom would come.

Burkhalter was deliberately not thinking of the red-haired woman when Duke Heath came in. The priest-medic caught the strained, negative mental picture, and nodded.

"Barbara Pell," he said. "I saw her." Both men blurred the surface of their minds. That couldn't mask their thoughts, but if any other brain began probing, there would be an instant's warning, during which they could take precautions. Necessarily, however, the conversation stayed oral rather than telepathic.

"They can smell trouble coming," Burkhalter said. "They've been infiltrating Sequoia lately, haven't they?"

"Yes. The minute you copped this consulate, they started to come

in." Heath nibbled his knuckles. "In forty years the paranoids have built up quite an organization."

"Sixty years," Burkhalter said. "My grandfather saw it coming back in '82. There was a paranoid in Modoc—a lone wolf at the time, but it was one of the first symptoms. And since then—"

"Well, they've grown qualitatively, not quantitatively. There are more true Baldies now than paranoids. Psychologically they're handicapped. They hate to intermarry with non-Baldies. Whereas we do, and the dominant strain goes on—spreads out."

"For a while," Burkhalter said.

Heath frowned. "There's no epidemic at Columbia Crossing. I had to get Selfridge off your neck somehow, and he's got a strongly paternal instinct toward his brother. That did it—but not permanently. With that so-and-so, the part equals the whole. You got the consulate; he had a nice little racket gyping the Hedgehounds; he hates you—so he jumps on your most vulnerable point. Also, he rationalizes. He tells himself that if you didn't have the unfair advantage of being a Baldy, you'd never have landed the consulate."

"It was unfair."

"We had to do it," Heath said. "Non-Baldies mustn't find out what we're building up among the Hedgehounds. Some day the woods folk may be our only safety. If a non-Baldy had got the consulate—"

"I'm working in the dark," Burkhalter said. "All I know is that

I've got to do what the Mutes tell me."

"I don't know any more than you do. The paranoids have their Power—that secret band of communication we can't tap—and only the Mutes have a method of fighting that weapon. Don't forget that, while we can't read a Mute's mind, the paranoids can't either. If you knew their secrets, your mind would be an open book—any telepath could read it."

Burkhalter didn't answer. Heath sighed and watched pine needles glittering in the sunlight outside the windows.

"It's not easy for me either," he said. "To be a surrogate. No non-Baldy has to be a priest as well as a medic. But I have to. The doctors up at the hospital feel more strongly about it than I do. They know how many psychotic cases have been cured because we can read minds. Meanwhile—" He shrugged.

Burkhalter was staring northward. "A new land is what we need," he said.

"We need a new world. Some day we'll get it."

A shadow fell across the door. Both men turned. A small figure was standing there, a fat little man with close-curling hair and mild blue eyes. The misericordia at his belt seemed incongruous, as though those pudgy fingers would fumble ludicrously with the hilt.

No Baldy will purposely read a nontelepath's mind, but there is an instinctive recognition between

Baldies. So Burkhalter and Heath knew instantly that the stranger was a telepath—and then, on the heels of that thought, came sudden, startled recognition of the emptiness where thought should be. It was like stepping on clear ice and finding it clear water instead. Only a few men could guard their minds thus. They were the Mutes.

"Hello," said the stranger, coming in and perching himself on the desk's edge. "I see you know me. We'll stay oral, if you don't mind. I can read your thoughts, but you can't read mine." He grinned. "No use wondering why, Burkhalter. If you knew, the paranoids would find out too. Now. My name's Ben Hobson." He paused. "Trouble, eh? Well, we'll kick that around later. First let me get this off my chest."

Burkhalter sent a swift glance at Heath. "There are paranoids in town. Don't tell me too much, unless—"

"Don't worry. I won't," Hobson chuckled. "What do you know about the Hedgehounds?"

"Descendants of the nomad tribes that didn't join the villages after the Blowup. Gypsies. Woods folk. Friendly enough."

"That's right," Hobson said. "Now what I'm telling you is common knowledge, even among the paranoids. You should know it. We've spotted a few cells among the Hedgehounds—Baldies. It started by accident, forty years ago, when a Baldy named Linc Cody was adopted by Hedgehounds and reared without knowing his herit-

age. Later he found out. He's still living with the Hedgehounds, and so are his sons."

"Cody?" Burkhalter said slowly. "I've heard stories of the Cody—"

"Psychological propaganda. The Hedgehounds are barbarians. But we want 'em friendly and we want to clear the way, for joining them, if that ever becomes necessary. Twenty years ago we started building up a figurehead in the forests, a living symbol who'd be overtly a shaman and really a delegate for us. We used mumbo-jumbo. Linc Cody dressed up in a trick suit, we gave him gadgets, and the Hedgehounds finally developed the legend of the Cody—a sort of benevolent woods spirit who acts as supernatural monitor. They like him, they obey him, and they're afraid of him. Especially since he can appear in four places at the same time."

"Eh?" Burkhalter said.

"Cody had three sons," Hobson smiled. "It's one of them you'll see today. Your friend Selfridge has fixed up a little plot. You're due to be murdered by one of the Hedgehound chiefs when that delegation gets here. I can't interfere personally, but the Cody will. It's necessary for you to play along. Don't give any sign that you expect trouble. When the Cody steps in, the chiefs will be plenty impressed."

Heath said, "Wouldn't it have been better not to tell Burkhalter what to expect?"

"No. For two reasons. He can read the Hedgehounds' minds—I give him carte blanche on that—and he must string along with the

Cody. O.K., Burkhalter?"

"O.K.", the consul nodded.

"Then I'll push off." Hobson stood up, still smiling. "Good luck."

"Wait a minute," Heath said. "What about Selfridge?"

"Don't kill him. Either of you. You know no Baldy must ever duel a non-Baldy."

Burkhalter was scarcely listening. He knew he must mention the thought he had surprised in Barbara Pell's mind, and he had been putting off the moment when he must speak her hateful name, open the gates of his thoughts wide enough to let her image slip back in, beautiful image, beautiful slender body, bright and dangerous and insane mind—

"I saw one of the paranoids in town awhile ago," he said. "Barbara Pell. A nasty job, that woman. She let slip something about their plans. Covered up too fast for me to get much, but you might think about it. They're up to something planned for fairly soon, I gathered."

Hobson smiled at him. "Thanks. We're watching them. We'll keep an eye on the woman too. All right, then. Good luck."

He went out. Burkhalter and Heath looked at one another.

The Mute walked slowly down the path toward the village. His mouth was pursed as he whistled; his plump cheeks vibrated. As he passed a tall pine he abruptly unsheathed his dagger and sprang around the tree. The man lurking there was caught by surprise. Steel

found its mark unerringly. The paranoid had time for only one desperate mental cry before he died.

Hobson wiped his dagger and resumed his journey. Under the close-cropped brown wig a mechanism, shaped like a skullcap, began functioning. Neither Baldy nor telepath could receive the signals Hobson was sending and receiving now.

"They know I'm here."

"Sometimes they do," a soundless voice came back. "They can't catch these modulated frequencies the helmets use, but they can notice the shield. Still, as long as none of 'em know why—"

"I just killed one."

"One less of the bichos," came the coldly satisfied response.

"I think I'd better stay here for a while. Paranoids have been infiltrating. Both Heath and Burkhalter think so. There's some contingent plan I can't read yet; the paranoids are thinking about it only on their own band."

"Then stay. Keep in touch. What about Burkhalter?"

"What we suspected. He's in love with the paranoid Barbara Pell. But he doesn't know it."

Both shocked abhorrence and unwilling sympathy were in the answering thought. "I can't remember anything like this ever happening before. He can read her mind; he knows she's paranoid—"

Hobson smiled. "The realization of his true feelings would upset him plenty, Jerry. Apparently you picked the wrong man for this job."

"Not from Burkhalter's record

He's always lived a pretty secluded life, but his character's above reproach. His empathy standing was high. And he taught sociology for six years at New Yale."

"He taught it, but I think it remained remote. He's known Barbara Pell for six weeks now. He's in love with her."

"But how—even subconsciously? Baldies instinctively hate and distrust the paranoids."

Hobson reached Sequoia's outskirts and kept going, past the terraced square where the blocky, insulated power station sat. "So it's perverse," he told the other Mute. "Some men are attracted only to ugly women. You can't argue with a thing like that. Burkhalter's fallen in love with a paranoid, and I hope to heaven he never realizes it. He might commit suicide. Or anything might happen. This is—" His thought moved with slow emphasis. "This is the most dangerous situation the Baldies have ever faced. Apparently nobody's paid much attention to Selfridge's talk, but the damage has been done. People *have* listened. And non-Baldies have always mistrusted us. If there's a blowoff, we're automatically the scapegoats."

"Like that, Ben?"

"The pogrom may start in Sequoia."

Once the chess game had started, there was no way to stop it. It was cumulative. The paranoids, the warped twin branch of the parallel telepathic mutation, were not insane; there was a psychoneurotic

pathology. They had only one basic delusion. They were the super race. On that foundation they built their edifice of planetary sabotage.

Non-Baldies outnumbered them, and they could not fight the technology that flourished in the days of decentralization. But if the culture of the non-Baldies were weakened, wrecked—

Assassinations, deftly disguised as duels or accidents; secret sabotage in a hundred branches, from engineering to publishing; propaganda, carefully sowed in the proper places—and civilization would have headed for a crack-up, except for one check.

The Baldies, the true, non-paranoid mutation, were fighting for the older race. They had to. They knew, as the blinded paranoids could not, that eventually the non-Baldies would learn of the chess game, and then nothing could stop a world-wide pogrom.

One advantage the paranoids had, for a while—a specialized band on which they could communicate telepathically, a wave length which could not be tapped. Then, in 2022, a Baldy technician had perfected the scrambler helmets, with a high-frequency modulation that was equally untappable. As long as a Baldy wore such a helmet under his wig, his mind could be read only by another Mute.

So they came to be called, a small, tight group of exterminators, sworn to destroy the paranoids completely—in effect, a police force, working in secret and never doffing

the helmets which shut them out from the complete rapport that played, so large a part in the psychic life of the Baldy race.

They had willingly given up a great part of their heritage. It was a curious paradox that only by strictly limiting their telepathic power could these few Baldies utilize their weapon against the paranoids. And what they fought for was the time of ultimate unification when the dominant mutation had become so numerically strong that in all the world, there would be no need for mental barriers or psychic embargoes.

Meanwhile the most powerful of the Baldy race, they could never know, except within a limited scope, the subtle gratification of the mental round-robin, when a hundred or a thousand minds would meet and merge into the deep, eternal peace that only telepaths can know.

They, too, were beggars in velvet.

III.

Burkhalter said suddenly, "What's the matter with you, Duke?"

Heath didn't move. "Nothing."

"Don't give me that. Your thoughts are on quicksand."

"Maybe they are," Heath said. "The fact is, I need a rest. I love this work, but it does get me down sometimes."

"Well, take a vacation."

"Can't. We're too busy. Our reputation's so good we're getting cases from all over. We're one of the first mental sanitariums to go in

for all-out Baldy psychoanalysis. It's been going on, of course, for years but *sub rosa*, more or less. People don't like the idea of Baldies prying into the minds of their relatives. However, since we started to show results—" His eyes lit up. "Even with psychosomatic illnesses we can help a lot, and mood disorders are our meat. The big question, you know, is *why*. Why they've been putting poison in the patient's food, why they watch him—and so forth. Once that question's answered fully, it usually gives the necessary clues. And the average patient's apt to shut up like a clam when the psychiatrist questions him. But—" Heath's excitement mounted, "this is the biggest thing in the history of medicine. There've been Baldies since 1955, and only now are the doctors opening their doors to us. Ultimate empathy. A psychotic locks his mind, so he's hard to treat. But we have the keys—"

"What are you afraid of?" Burkhalter asked quietly.

Heath stopped short. He examined his fingernails.

"It's not fear," he said at last. "It's occupational anxiety. Oh, the devil with that. Four-bit words. It's simpler, really; you can put it in the form of an axiom. You can't touch pitch without getting soiled."

"I see."

"Do you, Harry? It's only this, really. My work consists of visiting abnormal minds. Not the way an ordinary psychiatrist does it. I get into those minds. I see and feel their viewpoints. I know all

their terrors. The invisible horror that waits in the dark for them isn't just a word to me. I'm sane, and I see through the eyes of a hundred insane men. Keep out of my mind for a minute, Harry." He turned away. Burkhalter hesitated.

"O.K." Heath said, looking around. "I'm glad you mentioned this, though. Every so often I find myself getting entirely too empathic. Then I either take my copter up, or get in a round robin." For every Baldy, there was a deep, relaxing calm in the upper air, where the continual subsensory bombardment of thoughts was lessened almost to the vanishing point. "I'll see if I can promote a hook-up tonight. Are you in?"

"Sure," Burkhalter said. Heath nodded casually and went out. His thought came back,

I'd better not be here when the Hedgehounds come. Unless you—

No, Burkhalter thought, I'll be all right.

O.K. Here's a delivery for you.

Burkhalter opened the door in time to admit the grocer's boy, who had parked his trail car outside. He helped put the supplies away, saw that the beer would be sufficiently refrigerated, and pressed a few buttons that would insure a supply of pressure-cooked refreshments. The Hedgehounds were hearty eaters.

After that, he left the door open and relaxed behind his desk, waiting. It was hot in the office; he opened his collar and made the walls transparent. Air conditioning began to cool the room, but

sight of the broad valley below was equally refreshing. Tall pines rippled their branches in the wind.

It was not like New Yale. That had been one of the larger towns. Only the technological villages covered larger areas, and that was a matter of necessity; chemists and physicists need plenty of room to provide a margin of safety. But New Yale was intensely specialized in education. Sequoia, with its great hospital and its cellulose industry, was more of a complete, rounded unit. Isolated from the rest of the world except by air and television, it lay clean and attractive, sprawling in white and green and pastel plastics around the swift waters of the river that raced down seaward.

Burkhalter locked his hands behind his neck and yawned. He felt inexplicably fatigued, as he had felt from time to time for several weeks. Not that this work was hard; on the contrary. But reorientation to his new job wouldn't be quite as easy as he had expected. In the beginning he hadn't anticipated these wheels within wheels.

Barbara Pell, for example. She was dangerous. She, more than any of the others, perhaps, was the guiding spirit of the Sequoia paranoids. Not in the sense of planned action, no. But she ignited, like a flame. She is a born leader. And there were uncomfortably many paranoids here now: They had infiltrated—superficially with good reason, on jobs or errands or vacations; but the town was crammed with them, comparatively speaking.

The nontelepaths still outnumbered both Baldies and paranoids as they did on a larger scale all over the world—

He remembered his grandfather, Ed Burkhalter. If any Baldy had ever hated the paranoids, Ed Burkhalter had. And presumably with good reason, since one of the first paranoid plots—a purely individual attempt then—had indirectly tried to indoctrinate the mind of Ed's son, Harry Burkhalter's father. Oddly, Burkhalter remembered his grandfather's thin, harsh face more vividly than his father's gentler one.

He yawned again, trying to immerse himself in the calm of the vista beyond the windows. Another world? Perhaps only in deep space could a Baldy ever be completely free from those troubling half-fragments of vagrant thoughts that he sensed even now. And without that continual distraction, with one's mind utterly unhampered—he stretched luxuriously, trying to imagine the feeling of his body without gravity, and extending that parallel to his mind. But it was impossible.

The Baldies had been born before their time, of course—an artificially hastened mutation caused by radioactivity acting on human genes and chromosomes. Thus their present environment was wrong. Burkhalter toyed idly with the concept of a deep-space race, each individual mind so delicately attuned that even the nearness of any alien personality would interfere with the smooth processes of perfect thought.

Pleasant, but impractical. It would be a dead end. The telepaths weren't supermen, as the paranoid contended; at best they had only one fatally miraculous sense—fatal, because it had been mingled with common clay. With a genuine superman, telepathy would be merely one sense among a dozen other inconceivable ones.

Whereas Barbara Pell—the name and the face slid into his thoughts again, and the beautiful body, as dangerous and as fascinating as fire—whereas Barbara Pell, for instance, undoubtedly considered herself strictly super, like all the warped telepaths of her kind.

He thought of her bright, narrow gaze, and the red mouth with its sneering smile. He thought of the red curls moving like snakes upon her shoulders, and the red thoughts moving like snakes through her mind. He stopped thinking of her.

He was very tired. The sense of fatigue, all out of proportion to the energy he had expended, swelled and enufsed him. If the Hedgehound chiefs weren't coming, it would be pleasant to take a copter up. The inclosing walls of the mountains would fall away as the plane lifted into the empty blue, higher and higher, till it hung in space above a blurred, featureless landscape, half-erased by drifting clouds. Burkhalter thought of how the ground would look, a misty, dreamy Sime illustration, and, in his daydream, he reached out slowly to touch the controls. The copter slanted down, more and more steeply, till it was flashing suicidally

toward a world that spread hypnotically, like a magically expanding carpet.

Someone was coming. Burkhalter blurred his mind instantly and stood up. Beyond the open door was only the empty forest, but now he could hear the faint, rising overtones of a song. The Hedgehounds, being a nation of nomads, sang as they marched, old tunes and ballads of memorable simplicity that had come down unchanged from before the Blowup, though the original meanings had been forgotten.

*Green grow the lilacs, all sparkling with dew;
I'm lonely, my darling, since parting from you—*

Ancestors of the Hedgehounds had hummed that song along the borders of Old Mexico, long before war had been anything but distantly romantic. The grandfather of one of the current singers had been a Mexican, drifting up the California coast, dodging the villages and following a lazy wanderlust that led him into the Canadian forests at last. His name had been Ramon Alvarez but his grandson's name was Kit Carson Alvers, and his black beard rippled as he sang.

*But by our next meeting I'll hope to prove true,
And change the green lilacs for the red, white and blue.*

There were no minstrels among the Hedgehounds—they were all

minstrels, which is how folk songs are kept alive. Singing, they came down the path, and fell silent at sight of the consul's house.

Burkhalter watched. It was a chapter of the past come alive before his eyes. He had read of the Hedgehounds, but not until six weeks ago had he encountered any of the new pioneers. Their bizarre costumes still had power to intrigue him.

Those costumes combined functionality with decoration. The buckskin shirts, that could blend into a pattern of forest light and shade, were fringed with knotted tassels; Alvers had a coonskin cap, and all three men wore sandals,

made of soft, tough kidskin. Sheathed knives were at their belts, hunting knives, plainer and shorter than the misericordias of the towns-folk. And their faces showed a rakehell vigor, a lean, brown independence of spirit that made them brothers. For generations now the Hedgehounds had been wresting their living from the wilderness with such rude weapons as the bow one of them had slung across his shoulder, and the ethics of duelling had never developed among them. They didn't duel. They killed, when killing seemed necessary—for survival.

Burkhalter came to the threshold. "Come in," he said. "I'm the consul



—Harry Burkhalter."

"You got our message?" asked a tall, Scottish-looking chief with a bushy red beard. "That thing you got rigged up in the woods looked tetchy."

"The message conveyor? It works, all right."

"Fair enough. I'm Cobb Mattoon. This here's Kit Carson Alvers, and this un's Umpire Vine." Vine was clean-shaven, a barrel of a man who looked like a bear, his sharp brown eyes slanting wary glances all around. He gave a taciturn grunt and shook hands with Burkhalter. So did the others. As the Baldy gripped Alvers' palm, he knew that this was the man who intended to kill him.

He made no sign. "Glad you're here. Sit down and have a drink. What'll you have?"

"Whiskey," Vine grunted. His enormous hand smothered the glass. He grinned at the siphon shook his head, and gulped a quantity of whiskey that made Burkhalter's throat smart in sympathy.

Alvers, too, took whiskey; Mattoon drank gin, with lemon. "You got a smart lot of drinks here," he said, staring at the bar Burkhalter had swung out. "I can make out to spell some of the labels, but—what's that?"

"Drambuie. Try it?"

"Sure," Mattoon said, and his red-haired throat worked. "Nice stuff. Better than the corn we cook up in the woods."

"If you walked far, you'll be hungry," Burkhalter said. He

pulled out the oval table, selected covered dishes from the conveyor belt, and let his guests help themselves. They fell to without ceremony.

Alvers looked across the table. "You one of them Baldies?" he asked suddenly.

Burkhalter nodded. "Yes, I am. Why?"

Mattoon said, "So you're one of 'em." He was frankly staring. "I never seen a Baldy right close up. Maybe I have at that, but with the wigs you can't tell, of course."

Burkhalter grinned as he repressed a familiar feeling of sick distaste. He had been stared at before, and for the same reason.

"Do I look like a freak, Mr. Mattoon?"

"How long you been consul?" Mattoon asked.

"Six weeks."

"O.K.," the big man said, and his voice was friendly enough, though the tone was harsh. "You oughta remember there ain't no Mistering with the Hedgehounds. I'm Cobb Mattoon. Cobb to my friends, Mattoon to the rest. Nope. you don't look like no freak. Do people figger you Baldies are all sports?"

"A good many of them," Burkhalter said.

"One thing," Mattoon said, picking up a chop bone, "in the woods, we pay no heed to such things. If a guy's born funny, we don't mock him for that. Not so long as he sticks to the tribe and plays square. We got no Baldies among us, but

if we did, I kind of think they might get a better deal than they do now."

Vine grunted and poured more whiskey. Alvers' black eyes were fixed steadily on Burkhalter.

"You readin' my mind?" Mattoon demanded. Alvers drew in his breath sharply.

Without looking at him, Burkhalter said, "No. Baldies don't. It isn't healthy."

"True enough. Minding your own business is a plenty good rule. I can see how you'd have to play it. Look. This is the first time we come down here Alvers and Vine and me. You ain't seen us before. We heard rumors about this consulate—" He stumbled over the unfamiliar word. "Up to now, we traded with Selfridge sometimes, but we didn't have contact with townsfolk. You know why."

Burkhalter knew. The Hedgehounds had been outcasts, shunning the villages, and sometimes raiding them. They were outlaws.

"But now a new time's coming. We can't live in the towns; we don't want to. But there's room enough for everybody. We still don't see why they set up these con-consulates; still, we'll string along. We got a word."

Burkhalter knew about that, too. It was the Cody's word, whispered through the Hedgehound tribes—a word they would not disobey.

He said, "Some of the Hedgehound tribes ought to be wiped out. Not many. You kill them yourselves, whenever you find them—"

"Th' cannibals," Mattoon said. "Yeah. We kill them."

"But they're a minority. The main group of Hedgehounds have no quarrel with the townsfolk. And vice versa. We want to stop the raids."

"How do you figger on doin' that?"

"If a tribe has a bad winter, it needn't starve. We've methods of making foods. It's a cheap method. We can afford to let you have grub when you're hungry."

Vine slammed his whiskey glass down on the table and snarled something. Mattoon patted the air with a large palm.

"Easy, Umpire. He don't know . . . listen, Burkhalter. The Hedgehounds raid sometimes, sure. They hunt, and they fight for what they get. But they don't beg."

"I'm talking about barter," Burkhalter said. "Fair exchange. We can't set up force shields around every village. And we can't use Eggs on nomads. A lot of raids would be a nuisance, that's all. There haven't been many raids so far; they've been lessening every year. But why should there be any at all? Get rid of the motivation, and the effect's gone too."

Unconsciously he probed at Alvers' mind. There was a thought there, a sly crooked hungry thought, the avid alertness of a carnivore—and the concept of a hidden weapon. Burkhalter jerked back. He didn't want to know. He had to wait for the Cody to move though the temptation to provoke an open battle with Alvers was dangerously strong.

Yet that would only antagonize the other Hedgehounds; they couldn't read Vine's mind as Burkhalter could.

"Barter what?" Vine grunted.

Burkhalter had the answer ready. "Pelts. There's a demand for them. They're fashionable." He didn't mention that it was an artificially created fad. "Furs, for one thing. And—"

"We ain't Red Indians" Mattoon said. "Look what happened to them! There ain't nothing we need from townsfolk, except when we're starving. Then—well, maybe we can barter."

"If the Hegehounds unified—"

Alvers grinned. "In the old days," he said in a high, thin voice, "the tribes that unified got dusted off with the Eggs. We ain't unifying, brother!"

"He speaks fair, though," Mattoon said. "It makes sense. It was our granddaddies who had a feud with the villages. We've shaken down pretty well. My tribe ain't gone hungry for seven winters now. We migrate, we go where the pickin's are good and we get along."

"My tribe don't raid," Vine growled. He poured more whiskey.

Mattoon and Alvers had taken only two drinks; Vine kept pouring it down, but his capacity seemed unlimited. Now Alvers said, "It seems on the level. One thing I don't like. This guy's a Baldy."

Vine turned his enormous barrel of a torso and regarded Alvers steadily. "What you got against Baldies?" he demanded.

"We don't nothing about 'em. I heard stories—"

Vine said something rude. Mattoon laughed.

"You ain't polite, Kit Carson. Burkhalter's playin' host. Don't go throwing words around."

Alvers shrugged, glanced away, and stretched. He reached into his shirt to scratch himself—and suddenly the thought of murder hit Burkhalter like a stone from a sling-shot. It took every ounce of his will power to remain motionless as Alvers' hand slid back into view, a pistol coming into sight with it.

There was time for the other Hedgehounds to see the weapon, but no time for them to interfere. The death-thought anticipated the bullet. A flare of blinding, crimson light blazed through the room. Something, moving like an invisible whirlwind, flashed among them; then, as their eyes adjusted, they stood where they had leaped from their chairs, staring at the figure who confronted them.

He wore a tight-fitting suit of scarlet, with a wide black belt, and an expressionless mask of silver covered his face. A blue-black beard emerged from under it and rippled down his chest. Enormous muscular development showed beneath the skin-tight garments.

He tossed Alvers' pistol into the air and caught it. Then, with a deep, chuckling laugh, he gripped the weapon in both hands and broke the gun into a twisted jumble of warped metal.

"Break a truce, will you?" he said. "You little pipsqueak. What

you need is the livin' daylights whaled outa you, Alvers."

He stepped forward and smashed the flat of his palm against Alvers' side. The sound of the blow rang through the room. Alvers was lifted into the air and slammed against the further wall. He screamed once, dropped into a huddle, and lay there motionless.

"Git up," the Cody said. "You ain't hurt. Mebbe a rib cracked, that's all. If'n I'd smacked your head, I'd have broke your neck clean. Git up!"

Alvers dragged himself upright, his face dead white and sweating. The other two Hedgehounds watched, impassive and alert.

"Deal with you later on. Mattoon, Vine. What you got to do with this?"

"Nuthin'." Mattoon said. "Nuthin', Cody. You know that."

The silver mask was impassive. "Lucky fer you I do. Now listen. What I say goes. Tell Alvers' tribe they'll have to find a new boss. That's all."

He stepped forward. His arms closed about Alvers, and the Hedgehound yelled in sudden panic. Then the red blaze flared out again. When it had died, both figures were gone.

"Got any more whiskey, Burkhalter?" Vine said.

IV.

The Cody was in telepathic communication with the Mute, Hobson. Like the other three Codys, this one wore the same modulated-frequency helmet as the Mutes; it was

impossible for any Baldy or paranoid to tune in on that scrambled, camouflaged wave length.

It was two hours after sundown.

Alvers is dead, Hobson. Telepathy has no colloquialisms that can be expressed in language-symbols.

Necessary?

Yes. Absolute obedience to the Cody—a curiously mingled four-in-one concept—is vital. Nobody can be allowed to defy the Cody and get away with it.

Any repercussions?

None. Mattoon and Vine are agreeable. They got along with Burkhalter. What's wrong with him, Hobson?

The moment the question was asked, the Cody knew the answer. Telepaths have no secrets but subconscious ones—and the Mute helmet can even delve a little into the secret mind.

In love with a paranoid? The Cody was shocked.

He doesn't know it. He mustn't realize it yet. He'd have to reorient; that would take time; we can't afford to have him in the side lines just now. Trouble's bound to pop. What?

Fred Selfridge. He's drunk. He found out the Hedgehound chiefs visited Burkhalter today. He's afraid his trading racket is being cut from under him. I've told Burkhalter to stay out of sight.

I'll stay near here, then, in case I'm needed. I won't go home yet. Briefly Hobson caught sight of what home meant to the Cody; a secret valley in the Canadian wilderness, its whereabouts known

only to wearers of the helmets, who could never betray it inadvertently. It was there that the technicians among the Baldies sent their specialized products—via the Mutes. Products which had managed to build up a fully equipped headquarters in the heart of the forest, a centralization, it was true, but one whose whereabouts were guarded very thoroughly from the danger of discovery by either friend or enemy. From that valley laboratory in the woods came the devices that made the Cody the legendary figure he was among the Hedgehounds—a Paul Bunyan who combined incredible physical prowess with pure magic. Only such a figure could have commanded the respect and obedience of the woods runners.

Is Burkhalter safely hidden, Hobson? Or can I—

He's hidden. There's a round robin on, but Selfridge can't trace him through that.

O.K. I'll wait.

The Cody broke off. Hobson sent his thought probing out, across the dark miles, to a dozen other Mutes, scattered across the continent from Niagara to Salton. Each one of them was ready for the underground mobilization that might be necessary at any moment now.

It had taken ninety years for the storm to gather; its breaking would be cataclysmic.

Within the circle of the round robin was quiet, complete peace that only a Baldy can know. Burkhalter let his mind slip into place among the others, briefly touching and rec-

ognizing friends as he settled into that telepathic closed circuit. He caught the faintly troubled unrest from Duke Heath's thoughts; then the deep calm of rapport swallowed them both.

At first, on the outer fringes of the psychic pool, there were ripples and currents of mild disturbance, the casual distresses that are inevitable in any gregarious society, and especially among hypersensitive Baldies. But the purge of the ancient custom of the confessional quickly began to be effective. There can be no barriers between Baldies. The basic unit of the family is far more complete than among non-telepaths, and by extension, the entire Baldy group were bound together with ties no less strong because of their intangible subtlety.

Trust and friendship: these things were certain. There could be no distrust when the tariff wall of language was eliminated. The ancient loneliness of any highly specialized, intelligent organism was mitigated in the only possible way; by a kinship closer even than marriage, and transcending it.

Any minority group as long as it maintains its specialized integrity, is automatically handicapped. It is suspect. Only the Baldies, in all social history, had been able to mingle on equal terms with the majority group and still retain the close bond of kinship. Which was paradoxical, for the Baldies, perhaps, were the only ones who desired racial assimilation. They could afford to, for the telepathic mutation was dominant: the children of

Baldy father and nontelepathic mother—or vice versa—are Baldies.

But the reassurance of the round robins was needed; they were a symbol of the passive battle the Baldies had been fighting for generations. In them the telepaths found complete unity. It did not, and never would, destroy the vital competitive instinct; rather, it encouraged it. There was give and take. And, too, it was religion of the purest kind.

In the beginning, with no senses that non-Baldies can quite understand, you touched the minds of your friends, delicately, sensitively. There was a place for you, and you were welcomed. Slowly, as the peace spread, you approached the center, that quite indescribable position in space time that was a synthesis of intelligent, vital minds. Only by analogy can that locus even be suggested.

It is half-sleep. It is like the moment during which consciousness returns sufficiently so that you know you are not awake, and can appreciate the complete calm relaxation of slumber. If you could retain consciousness while you slept—that might be it.

For there was no drugging. The sixth sense is tuned to its highest pitch, and it intermingles with and draws from the other senses. Each Baldy contributes. At first the troubles and disturbances, the emotional unbalances and problems, are cast into the pool, examined, and dissolved in the crystal water of the rapport. Then, cleansed and strengthened, the Baldies approach

the center, where the minds blend into a single symphony. Nuances of color one member has appreciated, shadings of sound and light and feeling, each one is a grace note in orchestration. And each note is three-dimensional, for it carries with it the Baldy's personal, individual reaction to the stimulus.

Here a woman remembered the sensuous feel of soft velvet against her palm, with its corresponding mental impact. Here a man gave the crystal-sharp pleasure of solving a difficult mathematical equation, an intellectual counterpoint to the lower-keyed feeling of velvet. Step by step the rapport built up, until there seemed but a single mind, working in perfect cohesion, a harmony without false notes.

Then this single mind began building. It began to think. It was a psychic colloid, in effect, an intellectual giant given strength and sanity by very human emotions and senses and desires.

Then into that pellucid unity crashed a thought-message that for an instant made the minds cling together in a final desperate embrace in which fear and hope and friendship intermingled. The round robin dissolved. Each Baldy waited now, remembering Hobson's thought that said:

The pogrom's started.

He hadn't broadcast the message directly. The mind of a Mute, wearing his helmet, cannot be read except by another Mute. It was Duke Heath, sitting with Hobson in the moonlit grounds outside the hos-

pital, who had taken the oral warning and conveyed it to the other Baldies. Now his thoughts continued to flash through Sequoia.

Come to the hospital. Avoid non-Baldies. If you're seen, you may be lynched.

In dozens of homes, eyes met in which the terror had leaped instantly to full flower. All over the world, in that moment, something electric sparked with unendurable tension from mind to sensitive mind. No non-Baldy noticed. But, with the speed of thought, the knowledge girdled the planet.

From the thousands of Baldies scattered through the villages, from helicopter and surface car, came a thought of reassurance. *We are one, it said. We are with you.*

That—from the Baldies. From the paranoid, fewer in number, came a message of hatred and triumph. *Kill the hairy men!*

But no nontelepath outside Sequoia knew what was happening.

There was an old plastic house near the edge of town where Burkhalter had been hiding. He slipped out of a side door now into the cool quiet of the night. Overhead, a full moon hung yellow. A fan of diffused light reached upward from Redwood Street in the distance, and dimmer paths in the air marked the other avenues. Burkhalter's muscles were rigid. He felt his throat tense with near-panic. Generations of anticipation had built up a violent phobia in every Baldy, and now that the day had come—

Barbara Pell came dazzlingly into

his thoughts, and as his mind recalled her, so her mind touched his, wild and fiery, gloating with a triumph his whole being drew back from, while against all judgment something seemed to force him to receive her message.

He's dead, Burkhalter, he's dead! I've killed Fred Selfridge! The word is "kill," but in the mind of the paranoid it was not a word or a thought, but a reeking sensation of triumph, wet with blood, a screaming thought which the sane mind reels from.

You fool! Burkhalter shouted at her across the distant streets, his mind catching a little of her wildness so that he could not wholly control it. *You crazy fool, did you start this?*

He was starting out to get you. He was dangerous. His talk would have started the pogrom anyhow—people were beginning to think—

It's got to be stopped!

It will be! Her thought had a terrible confidence. *We've made plans.*

What happened?

Someone saw me kill Selfridge. It's the brother, Ralph, who touched things off—the old lynch law. Listen. Her thought was giddy with triumph.

He heard it then, the belling yell of the mob, far away, but growing louder. The sound to Barbara Pell's mind was fuel to a flame. He caught terror from her, but a perverted terror that lusted after what it feared. The same fury of blood-thirst was in the crowd's yell and in the red flame which was Bar-

bara Pell's mad mind. They were coming near her, nearer—

For a moment Burkhalter was a woman running down a dim street, stumbling, recovering, racing on with a lynch mob baying at her heels.

A man—a Baldy—dashed out into the path of the crowd. He tore off his wig and waved it at them. Ralph Selfridge, his thin young face dripping with sweat, shrieked in wordless hatred and turned the tide after this new quarry. The woman ran on into the darkness.

They caught the man. When a Baldy dies, there is a sudden gap in the ether, a dead emptiness that no telepath will willingly touch with his mind. But before that blankness snapped into being, the Baldy's thought of agony blazed through Sequoia with stunning impact, and a thousand minds reeled for an instant before it.

Kill the hairy men! shrieked Barbara Pell's thoughts, ravenous and mad. This was what the furies were. When a woman's mind lets go, it drops into abysses of sheer savagery that a man's mind never plumbs. The woman from time immemorial has lived closer to the abyss than the male—has had to, for the defense of her brood. The primitive woman cannot afford scruples. Barbara Pell's madness now was the red, running madness of primal force. And it was a fiery thing that ignited something in every mind it touched. Burkhalter felt little flames take hold at the edges of his thoughts and the whole fabric that was his identity

shivered and drew back. But he felt in the ether other minds, mad paranoid minds reach out toward her and cast themselves ecstatically into the holocaust.

Kill them, kill—kill! raved her mind.

Everywhere? Burkhalter wondered, dizzy with the pull he felt from that vortex of exultant hate. *All over the world, tonight? Have the paranoids risen everywhere, or only in Sequoia?*

And then he sensed suddenly the ultimate hatefulness of Barbara Pell. She answered the thought, and in the way she answered he recognized how fully evil the red-haired woman was. If she had lost herself utterly in this flaming intoxication of the mob he would still, he thought, have hated her, but he need not have despised her.

She answered quite coolly, with a part of her mind detached from the ravening fury that took its fire from the howling mob and tossed it like a torch for the other paranoids to ignite their hatred from.

She was an amazing and complex woman, Barbara Pell. She had a strange, inflammatory quality which no woman, perhaps, since Jeanne d'Arc had so fully exercised. But she did not give herself up wholly to the fire that had kindled within her at the thought and smell of blood. She was deliberately casting herself into that blood-bath, deliberately wallowing in the frenzy of her madness. And as she swallowed, she could still answer with a coolness more terrible than her ardor.



No, only in Sequoia, said the mind that an instant before had been only a blind raving exhortation to murder. No human must live to tell about it, she said in thought-shapes that dripped cold venom more burning than the hot blood-lust in her broadcast thoughts. We hold Sequoia. We've taken over the airfields and the power station. We're armed. Sequoia is isolated from the rest of the world. The pogrom's broken loose here—only here. Like a cancer. It must be stopped here.

How?

How do you destroy any cancer? Venom bubbled in the thought.

Radium Burkhalter thought, Radioactivity. The atomic bombs—

Dusting off? he wondered.

A burning coldness of affirmation answered him. *No human must live to tell about it. Towns have been dusted off before—by other towns. Pinewood may get the blame this time—there's been rivalry between it and Sequoia.*

But that's impossible. If the Sequoia teleaudios have gone dead—

We're sending out faked messages. Any copters coming in will be stopped. But we've got to finish it off fast. If one human escapes—Her thoughts dissolved into inhuman, inarticulate yammering, caught up and echoed avidly by a chorus of other minds.

Burkhalter shut off the contact sharply. He was surprised, a little, to find that he had been moving toward the hospital all during the interchange, circling through the

outskirts of Sequoia. Now he heard with his conscious mind the distant yelling that grew loud and faded again almost to silence, and then swelled once more. The mindless beast that ran the streets could be sensed tonight even by a non-telepath.

He moved silently through the dark for awhile sick and shaken as much by his contact with a paranoid mind as by the threat of what had happened and what might still come.

Jeanne d'Arc, he thought. She had it too, that power to inflame the mind. She, too, had heard—"voices?" Had she perhaps been an unwitting telepath born far before her time? But at least there had been sanity behind the power she exercised. With Barbara Pell—

As her image came into his mind again her thought touched him, urgent, repellently cool and controlled in the midst of all this holocaust she had deliberately stirred up. Evidently something had happened to upset their plans, for—

Burkhalter, she called voicelessly. Burkhalter, listen. We'll co-operate with you.

We hadn't intended to, but—where is the Mute, Hobson?

I don't know.

The cache of Eggs has been moved. We can't find the bombs. It'll take hours before another load of Eggs can be flown here from the nearest town. It's on the way. But every second we waste increases the danger of discovery. Find Hobson. He's the only mind we can't touch in Sequoia. We know no one else

has hidden the bombs. Get Hobson to tell us where they are. Make him understand, Burkhalter. This isn't a matter affecting only us. If word of this gets out, every telepath in the world is menaced. The cancer must be cut out before it spreads.

Burkhalter felt murderous thought-currents moving toward him. He turned toward a dark house, drifted behind a bush, and waited there till the mob had poured past, their torches blazing. He felt sick and hopeless. What he had seen in the faces of the men was horrible. Had this hatred and fury existed for generations under the surface—this insane mob-violence that could burst out against Baldies with so little provocation?

Common sense told him that the provocation had been sufficient. When a telepath killed a nontelepath, it was not duelling—it was murder. The dice were loaded. And for weeks now psychological propaganda had been at work in Sequoia.

The non-Baldies were not simply killing an alien race. They were out to destroy the personal devil. They were convinced by now that the Baldies were potential world-conquerors. As yet no one had suggested that the telepaths ate babies, but that was probably coming soon, Burkhalter thought bitterly.

Preview. Decentralization was helping the Baldies, because it made a temporary communication-embargo possible. The synapses that connected Sequoia to the rest of the world were blocked; they could not remain blocked forever.

He cut through a yard, hurdled a fence, and was among the pines. He felt an impulse to keep going, straight north, into the clean wilderness where this turmoil and fury could be left behind. But, instead, he angled south toward the distant hospital. Luckily he would not have to cross the river; the bridges would undoubtedly be guarded.

There was a new sound, discordant and hysterical. The barking of dogs. Animals, as a rule, could not receive the telepathic thoughts of humans, but the storm of mental currents raging in Sequoia now had stepped up the frequency—or the power—to a far higher level. And the thoughts of thousands of telepaths, all over the world, were focused on the little village on the Pacific Slope.

*Hark, hark! The dogs do bark!
The beggars are coming to town—*

But there's another poem, he thought, trying to remember. Another one that fits even better. What is it—

The hopes and fears of all the years—

V.

The mindless marking of the dogs was worst. It set the pitch of yapping, mad savagery that washed up around the hospital like the rising waves of a neap tide. And the patients were receptive too; wet packs and hydrotherapy, and, in a few cases, restraining jackets were necessary.

Hobson stared through the one-way window at the village far be-

low. "They can't get in here," he said.

Heath, haggard and pale, but with a new light in his eyes, nodded at Burkhalter.

"You're one of the last to arrive. Seven of us were killed. One child. There are ten others still on their way. The rest—safe here."

"How safe?" Burkhalter asked. He drank the coffee Heath had provided.

"As safe as anywhere. This place was built so irresponsible patients couldn't get out. Those windows are unbreakable. It works both ways. The mob can't get in. Not easily, anyhow. We're fireproof, of course."

"What about the staff? The non-Baldies, I mean."

A gray-haired man seated at a nearby desk stopped marking a chart to smile wryly at Burkhalter. The consul recognized him: Dr. Wayland chief psychiatrist.

Wayland said, "The medical profession has worked with Baldies for a long time, Harry. Especially the psychologists. If any non-Baldy can understand the telepathic viewpoint, we do. We're noncombatants."

"The hospital work has to go on," Heath said. "Even in the face of this. We did something rather unprecedented, though. We read the minds of every non-Baldy within these walls. Three men on the staff had a preconceived dislike of Baldies, and sympathized with the lynchings. We asked them to leave. There's no danger of Fifth Column work here now."

Hobson said slowly, "There was another man—Dr. Wilson. He went down to the village and tried to reason with the mob."

Heath said, "We got him back here. He's having plasma pumped into him now."

Burkhalter set down his cup. "All right. Hobson, you can read my mind. How about it?"

The Mute's round face was impassive. "We had our plans, too. Sure, I moved the Eggs. The paranoids won't find 'em now."

"More Eggs are being flown in. Sequoia's going to be dusted off. You can't stop that."

A buzzer rang; Dr. Wayland listened briefly to a transmitted voice, picked up a few charts and went out. Burkhalter jerked his thumb toward the door.

"What about him? And the rest of the staff? They know, now."

Heath grimaced. "They know more than we wanted them to know. Until tonight, no nontelepath has even suspected the existence of the paranoid group. We can't expect Wayland to keep his mouth shut about this. The paranoids *are* a menace to non-Baldies. The trouble is, the average man won't differentiate between paranoids and Baldies. Are those people down there"—he glanced toward the window—"are they drawing the line?"

"It's a problem," Hobson admitted. "Pure logic tells us that no non-Baldy must survive to talk about this. But is that the answer?"

"I don't see any other way," Burkhalter said unhappily. He

thought suddenly of Barbara Pell and the Mute gave him a sharp glance.

"How do you feel about it Heath?"

The priest-medic walked to the desk and shuffled case histories. "You're the boss, Hobson. I don't know. I'm thinking about my patients. Here's Andy Pell. He's got Alzheimer's disease—early senile psychosis. He's screwed up. Can't remember things very well. A nice old guy. He spills food on his shirt, he talks my ear off, and he makes passes at the nurses. He'd be no loss to the world, I suppose. Why draw a line, then? If we're going in for killing, there can't be any exceptions. The non-Baldy staff here can't survive either."

"That's the way you feel?"

Heath made a sharp, angry gesture. "No! It isn't the way I feel! Mass murder would mean canceling the work of ninety years, since the first Baldy was born. It'd mean putting us on the same level as the paranoids? Baldies don't kill."

"We kill paranoids."

"There's a difference. Paranoids are on equal terms with us. And . . . oh, I don't know, Hobson. The motive would be the same—to save our race. But somehow one doesn't kill a non-Baldy."

"Even a lynch mob?"

"They can't help it," Heath said quietly. "It's probably casuistry to distinguish between paranoids and non-Baldies but there *is* a difference. It would mean a lot of difference to us. We're not killers."

Burkhalter's head drooped. The sense of unendurable fatigue was back again. He forced himself to meet Hobson's calm gaze.

"Do you know any other reason?" he asked.

"No," the Mute said. "I'm in communication, though. We're trying to figure out a way."

Heath said, "Six more got here safely. One was killed. Three are still on their way."

"The mob hasn't traced us to the hospital yet," Hobson said. "Let's see. The paranoids have infiltrated Sequoia in considerable strength, and they're well armed. They've got the airfields and the power station. They're sending out faked teleaudio messages so no suspicion will be aroused outside. They're playing a waiting game; as soon as another cargo of Eggs gets here, the paranoids will beat it out of town and erase Sequoia. And us, of course."

"Can't we kill the paranoids? You haven't any compunctions about eliminating them, have you, Duke?"

Heath shook his head and smiled; Hobson said, "That wouldn't help. The problem would still exist. Incidentally, we could intercept the copter flying Eggs here, but that would just mean postponement. A hundred other copters would load Eggs and head for Sequoia; some of them would be bound to get through. Even fifty cargoes of bombs would be too dangerous. You know how the Eggs work."

Burkhalter knew, all right. One

Egg would be quite sufficient to blast Sequoia entirely from the map.

Heath said, "Justified murder doesn't bother me. But killing non-Baldies—if I had any part in that, the mark of Cain wouldn't be just a symbol. I'd have it on my forehead—or inside my head, rather. Where any Baldy could see it. If we could use propaganda on the mob—"

Burkhalter shook his head. "There's no time. And even if we did cool off the lynchers, that wouldn't stop word of this from getting around. Have you listened in on the catch-phrases, Duke?"

"The mob?"

"Yeah. They've built up a nice personal devil by now. We never made any secret of our round robins, and somebody had a bright idea. We're polygamists. Purely mental polygamists, but they're shouting that down in the village now."

"Well," Heath said, "I suppose they're right. The norm is arbitrary, isn't it—automatically set by the power-group? Baldies are variants from that norm."

"Norms change."

"Only in crises. It took the Blowup to bring about decentralization. Besides, what's the true standard of values? What's right for non-Baldies isn't always right for telepaths."

"There's a basic standard of morals—"

"Semantics." Heath shuffled his case histories again. "Somebody once said that insane asylums won't

find their true function till ninety percent of the world is insane. Then the sane group can just retire to the sanitariums." He laughed harshly. "But you can't even find a basic standard in psychoses. There's a lot less schizophrenia since the Blowup; most d. p. cases come from cities. The more I work with psycho patients, the less I'm willing to accept any arbitrary standards as the real ones. This man—"he picked up a chart—"he's got a fairly familiar delusion. He contends that when he dies, the world will end. Well—maybe, in this one particular case it's true."

"You sound like a patient, yourself," Burkhalter said succinctly.

Hobson raised a hand. "Heath, I suggest you administer sedatives to the Baldies here. Including us. Don't you feel the tension?"

The three were silent for a moment, telepathetically listening. Presently Burkhalter was able to sort out individual chords in the discordant thought-melody that was focused on the hospital.

"The patients," he said. "Eh?"

Heath scowled and touched a button. "Fernald? Issue sedatives—" He gave a quick prescription, clicked off the communicator, and rose. "Too many psychotic patients are sensitive," he told Hobson. "We're liable to have a panic on our hands. Did you catch that depressive thought—" He formed a quick mental image. "I'd better give that man a shot. And I'd better check up on the violent cases, too." But he waited.

Hobson remained motionless,

staring out the window. After a time he nodded.

"That's the last one. We're all here now, all of Us. Nobody's left in Sequoia but paranoids and non-Baldies."

Burkhalter moved his shoulders uneasily. "Thought of an answer yet?"

"Even if I had, I couldn't tell you, you know. The paranoids could read your mind."

True enough. Burkhalter thought of Barbara Pell, somewhere in the village—perhaps barricaded in the power station, or at the airfield. Some confused, indefinable emotion moved within him. He caught Hobson's bright glance.

"There aren't any volunteers among the Baldies," the Mute said. "You didn't ask to be involved in this crisis. Neither did I, really. But the moment a Baldy's born, he automatically volunteers for dangerous duty, and stands ready for instant mobilization. It just happened that the crisis occurred in Sequoia."

"It would have happened somewhere. Sometime."

"Right. Being a Mute isn't so easy, either. We're shut out. We can never know a complete round robin. We can communicate fully only with other Mutes. We can never resign." Not even to another Baldy could a Mute reveal the existence of the Helmet.

Burkhalter said, "Our mutation wasn't due for another thousand years, I guess. We jumped the gun."

"We didn't. But we're paying.

The Eggs were the fruit of knowledge, in a way. If man hadn't used atomic power as he did, the telepathic mutations would have had their full period of gestation. They'd never have appeared till the planet was ready for them. Not exactly ready, perhaps," he qualified, "but we wouldn't have had quite this mess on our hands."

"I blame the paranoids," Burkhalter said. "And . . . in a way . . . myself."

"You're not to blame."

The Baldy grimaced "I think I am, Hobson. Who precipitated this crisis?"

"Selfridge—" Hobson was watching.

"Barbara Pell," Burkhalter said. "She killed Fred Selfridge. Ever since I came to Sequoia, she's been riding me."

"So she killed Selfridge to annoy you? That doesn't make sense."

"It fitted in with the general paranoid plan, I suppose. But it was what she wanted, too. She couldn't touch me when I was consul. But where's the consulate now?"

Hobson's round face was very grave. A Baldy intern came in, offered sedatives and water, and the two silently swallowed the barbiturates. Hobson went to the window and watched the flaring of torches from the village. His voice was muffled.

"They're coming up," he said. "Listen."

The distant shouting grew louder as they stood there in silence.

Nearer and louder. Burkhalter moved forward to Hobson's side. The town was a flaming riot of torches now, and a river of light poured up the curved road toward the hospital.

"Can they get in?" someone asked in a hushed voice.

Heath shrugged. "Sooner or later."

The intern said, with a touch of hysteria: "What can we *do*?"

Hobson said, "They're counting on the weight of numbers, of course. And they've got plenty of that. They aren't armed, I suppose, except for daggers—but then they don't need arms to do what they think they're going to do."

There was a dead silence in the room for a moment. Then Heath said in a thin voice, "What they *think*—?"

The Mute nodded toward the window. "Look."

There was a small rush toward the glass. Peering over one another's shoulders, the men in the room stared down the slope of the road, seeing the vanguard of the mob so near already that the separate torches were clearly distinguishable, and the foremost of the distorted, shouting faces. Ugly, blind with hatred and the intention to kill.

Hobson said in a detached voice, as if this imminent disaster were already in the past, "We've got the answer, you see—we know about *this*. But there's another problem I can't solve. Maybe it's the most important one of all." And he looked at the back of Burkhalter's

head. Burkhalter was watching the road. Now he leaned forward suddenly and said,

"Look! There in the woods—what is it? Something moving—people? Listen—what is it?"

No one paid any attention beyond the first two or three words he spoke, for all of them saw it now. It happened very swiftly. One moment the mob was pouring unchecked up the road, the next a wave of shadowy forms had moved purposefully out of the trees in compact, disciplined order. And above the hoarse shouting of the mob a cry went terribly up, a cry that chilled the blood.

It was the shrill, falsetto that had once been the Rebel Yell. Two hundred years ago it echoed over the bloody battlefields of the Civil War. It moved westward with the conquered rebels and became the cowboy yell. It moved and spread with westerners after the Blow-Up, the tall, wild men who could not endure the regimentation of the towns. Now it was the Hedgehound yell.

From the window the hospital watchers saw it all, enacted as if on a firelit stage below them.

Out of the shadows the men in buckskin came. Firelight flashed on the long blades they carried, on the heads of the arrows they held against the bent bows. Their wild, shrill, terrible yell rose and fell, drowning out the undisciplined screams of the mob.

The buckskin ranks closed in behind the mob, around it. The townsmen began to huddle together

a little, until the long loosely ordered mob had become a roughly compact circle with the woodsmen surrounding them. There were cries of, "Kill 'em! Get 'em all!" from the townsmen, and the disorderly shouts rose raggedly through the undulations of the Hedgehound yell, but you could tell after the first two or three minutes who had the upper hand.

Not that there was no fighting. The men at the front of the mob had to do something. They did—or tried to. It was little more than a scuffle as the buckskin forms closed in.

"They're only townsmen, you see," Hobson said quietly, like a lecturer explaining some movie scene from old newsreel files. "Did you ever think before how completely the profession of the fighting man has died out since the Blow-Up? The only organized fighting men left in the world are out there, now." He nodded toward the Hedgehound ranks, but nobody saw the motion. They were all watching with the incredulous eagerness of reprieved men as the Hedgehounds competently dealt with the mob which was so rapidly changing into a disorganized rabble now as the nameless, powerful, ugly spirit that had welded it into a mob died mysteriously away among them.

All it took was superior force, superior confidence—the threat of weapons in more accustomed hands. For four generations these had been townsmen whose ancestors never knew what war meant. For four generations the Hedgehounds had

lived only because they knew unremitting warfare, against the forest and mankind.

Competently they went about rounding up the mob.

"It doesn't solve anything," Burkhalter said at last, reluctantly, turning from the window. Then he ceased to speak, and sent his mind out in rapid thoughts so that the nontelepaths might not hear. *Don't we have to keep it all quiet? Do we still have to decide about—killing them all? We've saved our necks, sure—but what about the rest of the world?*

Hobson smiled a grim, thin smile that looked odd on his plump face. He spoke aloud, to everyone in the room.

"Get ready," he said. "We're leaving the hospital. All of us. The non-Baldy staff, too."

Heath, sweating and haggard, caught his breath. "Wait a minute. I know you're the boss, but—I'm not leaving my patients!"

"We're taking them, too," Hobson said. Confidence was in his voice, but not in his eyes. He was looking at Burkhalter. The last and most difficult problem was still to be met.

The Cody's thought touched Hobson's mind. *All ready.*

You've got enough Hedgehounds?

Four tribes. They were all near the Fraser Run. The new consultate set-up had drawn 'em from the north. Curiosity.

Report to group.

Scattered across the continent, Mutes listened. *We've cleaned out Sequoia. No deaths. A good many got pretty well beaten up, but they can all travel. (A thought of wry amusement.) Your townspeople ain't fighters.*

Ready for the march?

Ready. They're all rounded up. men, women and children, in the north valley. Umpire Vine's in charge of that sector.

Start the march. About the paranooids, any trouble there?

No trouble. They haven't figured it all out yet. They're still in the town, sitting tight. We've got to move fast, though. If they try to get out of Sequoia, my men will kill. There was a brief pause. Then—The march has started.

Good. Use the blindfolds when necessary.

There are no stars underground, the Cody's thought said grimly.

No non-Baldy must die. Remember, this is a point of honor. Our solution may not be the best one, but—

None will die.

We're evacuating the hospital. Is Mattoon ready?

Ready. Evacuate.

Burkhalter rubbed a welt on his jaw. "What happened?" he asked thickly, staring around in the rustling darkness of the pines.

A shadow moved among the trees. "Getting the patients ready for transportation — remember? You were slugged. That violent case—"

"I remember." Burkhalter felt

sheepish. "I should have watched his mind closer. I couldn't. He wasn't *thinking*—" He shivered slightly. Then he sat up. "Where are we?"

"Quite a few miles north of Sequoia."

"My head feels funny." Burkhalter rearranged his wig. He rose, steadying himself against a tree, and blinked vaguely. After a moment he had reoriented. This must be Mount Nichols, the high peak that rose tall among the mountains guarding Sequoia. Very far away, beyond intervening lower summits, he could see a distant glow of light that was the village.

But beneath him, three hundred feet down, a procession moved through a defile in the mountain wall. They emerged into the moonlight and went swiftly on and were lost in shadow.

There were stretcher-bearers, and motionless, prone figures being carried along; there were men who walked arm in arm; there were tall men in buckskin shirts and fur caps, bows slung across their shoulders, and they were helping, too. The

silent procession moved on into the wilderness.

"The Sequoia Baldies," Hobson said. "And the non-Baldy staff—and the patients. We couldn't leave them."

"But—"

"It was the only possible answer for us, Burkhalter. Listen. For twenty years we've been preparing—not for this, but for the pogrom. Up in the woods, in a place only Mutes know about, there's a series of interlocking caves. It's a city now. A city without population. The Codys—there are four of them, really—have been using it as a laboratory and a hideout. There's material there for hydroponics, artificial sunlight, everything a culture needs. The caves aren't big enough to shelter all the Baldies, but they'll hold Sequoia's population."

Burkhalter stared. "The non-Baldies?"

"Yes. They'll be segregated, for a while, till they can face truth.



They'll be prisoners; we can't get around that fact. It was a choice between killing them and holding them incommunicado. In the caves; they'll adapt. Sequoia was a tight, independent community. Family units won't be broken up. The same social pattern can be followed. Only—it'll be underground, in an artificial culture."

"Can't the paranoids find them?"

"There are no stars underground. The paranoids may read the minds of the Sequoians, but you can't locate a mind by telepathic triangulation. Only Mutes know the location of the caves, and no paranoid can read a Mute's thoughts. They're on their way now to join us—enough Mutes to take the Sequoians on the last lap. Not even the Hedgehounds will know where they're going."

"Then the secret will be safe among telepaths—except for the Hedgehounds. What if they talk?"

"They won't. Lots of reasons. For one, they have no communication to speak of with the outside world. For another, they're under an autocracy, really. The Codys know how to enforce their rules. Also, have you thought how the towns would react if they knew Hedgehounds had cleaned out a whole village? To save their own skins the Hedgehounds will keep their mouths shut. Oh, it *may* leak out. With so many individuals involved you never can be absolutely sure. But I think for an extemporeaneous plan, it'll work out well enough." Hobson paused and his mind brushed with the keenness of

a quick glance against Burkhalter's mind. "What's the matter, Burk? Still worried about something?"

"The people, I suppose," Burkhalter admitted. "The humans. It doesn't seem exactly fair, you know. I'd hate to be cut off forever from all contact with the rest of the world. They—"

Hobson thought an explosive epithet. It was much more violent thought than voiced. He said, "Fair! Of course it isn't fair! You saw that mob coming up the road, Burk—did they have fairness in mind then? If anyone ever deserved punishment that mob does!" His voice grew milder. "One thing we tend to lose sight of, you see. We grow up with the idea of indulgence toward humans pounded into us to such an extent we almost forget they're responsible people, after all. A pogrom is the most indefensible concerted action a group can be guilty of. It's always an attack by a large majority on a defenseless minority. These people would have killed us all without a qualm, if they could. They're lucky we aren't as vicious as they were. They deserve a lot worse than they're getting, if you ask me. We didn't ask to be put in a spot like this. There's unfairness involved all around, but I think this solution is the best possible under the circumstances."

They watched the procession below moving through the moonlight. Presently Hobson went on. "Another angle turned up after we put this thing in motion, too. A mighty

good one. By sheer accident we're going to have a wonderful laboratory experiment going on in human relations. It won't be a dead-end community in the caves. Eventually, we think the Baldies and the non-Baldies will intermarry there. The hospital staff are potential good-will ambassadors. It'll take careful handling, but I think with our facilities for mind reading and the propaganda we can put out adjusted by the readings, things will work out. It may be the basis for the ultimate solution of the whole Baldy-human problem.

"You see, this will be a microcosm of what the whole world ought to be—would have been if the Blow-Up hadn't brought us telepaths into being ahead of our normal mutation time. It will be a community of humans dominated by telepaths, controlled by them benevolently. We'll learn how to regulate relations with humans, and there'll be no danger while we learn. It'll be trial and error without punishment for error. A little hard on the humans, perhaps, but no harder than it's been for generations on the Baldy minority all over the world. We might even hope that in a few years' time the experiment may go well enough that even if the news leaked out, the community members would elect to stay put. Well, we'll have to wait and see. It can't be solved any better way that we know of. There is no solution, except adjustment between the races. If every Baldy on earth committed voluntary suicide, there'd still be Baldies born. You can't stop

it. The Blow-Up's responsible for that, not us. We . . . wait a minute."

Hobson turned his head sharply, and in the rustling night silences of the forest, broken only by the subdued noises of the proposition far below, they listened for a sound not meant for ears.

Burkhalter heard nothing, but in a moment Hobson nodded.

"The town's about to go," he said.

Burkhalter frowned. "There's another loose end, isn't there? What if they blame Pinewood for dusting Sequoia off?"

"There won't be any proof either way. We've about decided to spread rumors indicating two or three other towns along with Pinewood, enough to confuse the issue. Maybe we'll say the explosion might have come from an accident in the Egg dump. That's happened, you know. Pinewood and the rest will just have to get along under a slight cloud for awhile. They'll have an eye kept on them, and if they should show any more signs of aggression . . . but of course, nothing will happen. I think . . . look, Burkhalter! There she goes!"

Far away below them the glow that was Sequoia lay like a lake of light in the mountains' cup. As they watched, it changed. A nova flamed in incandescent splendor, whitening the men's faces and showing the pines in starkly black silhouette.

For an instant the soundless ether was full of a stunning, mindless cry that rocked the brain of every telepath within its range. Then there

was that terrible void, that blankness of cessation into which no Baldy cares to look. This time it was a mighty vortex, for a great many telepathic minds perished together in that nova. It was a vortex that made the mind reel perilously near its great, sucking brink. Paranoid they may have been, but they were telepathic too, and their going shook every brain that could perceive the passing.

In Burkhalter's mind a reeling blindness struck. He thought, *Barbara, Barbara...*

It was an utterly unguarded cry. He made no effort to hush it from Hobson's perception.

Hobson said, as if he had not heard, "That's the finish. Two Mutes in copters dropped the Eggs. They're watching now. No survivors. Burkhalter—"

He waited. Slowly Burkhalter pulled himself out of that blind abyss into which the beautiful, terrible, deadly image of Barbara Pell whirled away toward oblivion. Slowly he brought the world back into focus around him.

"Yes?"

"Look. The last of the Sequoians are going by. You and I aren't needed here any more, Burk."

There was significance in that statement. Burkhalter shook himself mentally and said with painful bewilderment,

"I don't . . . quite get it. Why did you bring me up here? Am I—" He hesitated. "I'm not going with the others?"

"You can't go with them," the

Mute said quietly. There was a brief silence; a cool wind whispered through the pine needles. The pungent fragrance and freshness of the night washed around the two telepaths. "Think, Burkhalter," Hobson said. "Think."

"I loved her," Burkhalter said. "I know that now." There was shock and self-revulsion in his mind, but he was too stunned by the realization for much emotion to come through yet.

"You know what that means, Burkhalter? You're not a true Baldy. Not quite." He was silent for a moment. "You're a latent paranoid, Burk," Hobson said.

There was no sound or thought between them for a full minute. Then Burkhalter sat down suddenly on the pine needles that carpeted the forest floor.

"It isn't true," he said. The trees were reeling around him.

"It is true, Burk." Hobson's voice and mind were infinitely gentle. "Think. Would you—could you—have loved a paranoid, and such a paranoid as that, if you were a normal telepath?"

Dumbly Burkhalter shook his head. He knew it was true. Love between telepaths is a far more unerring thing than love between blind and groping humans. A telepath can make no mistake about the quality of the beloved's character. He could not if he wished. No normal Baldy could feel anything but utter revulsion toward the thing that had been Barbara Pell. No *normal* Baldy—

"You should have hated her. You

did hate her. But there was something more than hate. It's a paranoid quality, Burk, to feel drawn toward what you despise. If you'd been normal, you'd have loved some normal telepathic woman, someone your equal. But you never did. You had to find a woman you could look down on. Someone you could build up your ego by despising. No paranoid can admit any other being is his equal. I'm sorry, Burk. I hate to say these things."

Hobson's voice was like a knife, merciless and merciful, excising diseased tissue. Burkhalter heard him, and trod down the latent hatred which the truth—and he knew the truth of it—brought out in his double mind.

"Your father's mind was warped too, Burk," Hobson went on. "He was born too receptive to paranoid indoctrination—"

"They tried their tricks on him when he was a kid," Burkhalter said hoarsely. "I remember that."

"We weren't sure at first about what ailed you. The symptoms didn't show till you took on the consulate. Then we began to build up a prognosis, of sorts. You didn't really want that job, Burkhalter. Not subconsciously. Those heavy fatigues were a defense. I caught that daydream of yours today—not the first one you've had. Daydreams concerned with suicide—another symptom, and another means of escape. And Barbara Pell—that was the payoff. You couldn't let yourself know what your real feelings were, so you projected the opposite emotion—hatred. You

believed she was persecuting you, and you let your hatred have full freedom. But it wasn't hatred. Burk."

"No. It wasn't hatred. She . . . she was horrible, Hobson! She was horrible!"

"I know."

Burkhalter's mind boiled with violent emotions, too tangled to sort out. Hatred, intolerable grief, bright flashes of the paranoid world, memory of Barbara Pell's wild mind like a flame in the wind.

"If you're right, Hobson," he said with difficulty, "you've got to kill me. I know too much. If I'm really a latent paranoid some day I might betray—Us."

"Latent," Hobson said. "There's a world of difference—if you can be honest with yourself."

"I'm not safe if I live. I can feel—disease—back in my mind right now. I—hate you, Hobson. I hate you for showing me myself. Some day the hate may spread to all Mutes and all Baldies. How can I trust myself any more?"

"Touch your wig, Burk," Hobson said.

Bewildered, Burkhalter laid a shaking hand upon his head. He felt nothing unusual. He looked at Hobson in complete confusion.

"Take it off, Burk."

Burkhalter lifted off the wig. It came hard, the suction caps that held it in place giving way with reluctance. When it was off, Burkhalter was amazed to feel that there was still something on his head. He lifted his free hand and felt with

unsteady fingers a fine cap of wires like silk, hugging his skull. He looked up in the moonlight and met Hobson's eyes. He could see the fine wrinkles around them, and the look of kindness and compassion on the Mute's round face. For an instant he forgot even the mystery of the strange cap on his head. He cried voicelessly,

Help me, Hobson! Don't let me hate you!

Instantly into his mind came a firm, strong, compassionate locking of thoughts from many, many minds. It was a communion more intimate and of a different quality than anything he had ever felt before. And it was to the mind as the clasp of many supporting hands would be to the body when the body is weary and in infinite need of support.

You're one of us now, Burkhalter. You wear the Helmet. You are a Mute. No Paranoid can ever read your mind.

It was Hobson's thought that spoke to him, but behind it spoke the thoughts of many others, many

trained minds from hundreds of other Mutes, all speaking as if in a chorus that echoed and amplified all Hobson said.

But I . . . I'm a latent—

The hundreds of minds blended into a cohesive unit, the psychic colloid of the round robin, but a different, more intense union, wrought into something new by the caps that filtered all their thoughts. The unit became a single mind, strong and sane and friendly, welcoming the newcomer. He did not find miraculous healing there—he found something better.

Truth. Honesty.

Now the warp in his mind, the paranoid quirk and its symptoms and illogic, became very clear. It was the highest kind of psychoanalysis, which only a Baldy can know.

He thought, *It will take time. The cure will take—*

Hobson was standing behind him. *I'll be with you. Until you can stand alone. And even then—we'll all be with you. You are one of us. No Baldy is ever alone.*

THE END.





Orders

by

MALCOM JAMESON

This is the last Malcolm Jameson story that we can publish, a bit of the Commander Bullard saga found among Jameson's papers after his death.

Illustrated by Williams

Being the world's worst thumb twiddler, Bullard was unhappy. He was restless, disgusted and bored.

There was nothing to do. There could be nothing to do. And if there should be, by any chance,

there was nothing to do it with. That he temporarily bore the rank of admiral while acting as commandant of the great Lunar Base helped him not at all. He had little taste for brass-hattism and an immense loathing for swivel chairs. He got up from the one he was sitting in and paced the floor of his sumptuous office for awhile. Then he planted himself before its big window and stared gloomily at the dreary scene outside.

The uncanny silence in that former bustling place was depressing. No longer was heard the shrill whistles of traveling cranes, the whir of fabricating machines, or the *boom-boom* of heavy stamps. The shops were closed; the men laid off; the ships away. Ships! Bullard's mouth tightened. Yes, there were ships present, rows upon rows of them—dead hulls of what had once been proud warships, now rusting away until the wrecking crews should come and go to work on them. What remnants of the Fleet that had escaped the ax wielded by the gang of pacifists now in control were dispersed to the far corners of the System, their crews enjoying themselves on leisurely, junketing "good-will cruises." His own good ship, the *Pollux*, was the sole exception. She lay at the moment over in the remodeling dock in Gobi Crater, her machinery torn out and the bulk of her crew disbanded. The amazing new astral drive units that were meant to go in her still lay unboxed in the storehouse, the nullochrons were not even on order. It might be a year

before work was resumed. Bullard sighed. So this was the peace he had fought hard for. Bah!

Peace reigned from the flaming face of Sol to the outermost reaches of the Plutonian orbit. All was serene. Some claimed it would always be serene hereafter; the human race was fed up with war. There was never to be another one. Yes, peace. It was supposed to be wonderful, but Bullard felt otherwise. It was not that he was a war-loving man; far from it. But he knew his Martians, and his Callistans, and his Venusians, and all the rest, not forgetting some scheming Tellurians who dwelt down below on Earth. It was too much to expect that they would stay bound forever by the lofty phrases and noble sentiments expressed in the Treaty of Juno. It is true that they had forsaken the use of force in interplanetary relations, but the paths of history are littered with the torn scraps of similar treaties, though men seemed to have forgotten it. At any rate, the peace had borne heavily on the armed services. Officers and men were retired in droves, battleships and cruisers were enthusiastically scrapped, new construction came to a dead halt. There was nothing to look forward to but dull routine and inaction. Bullard sighed again, and gnawed his lower lip.

He was about to turn away from the window, weary from the bleak view and his own depressing thoughts, when his eye caught the glint of sunlight on burnished gold. The glitter came from a small sky-

cycle that had just entered the dome through the southwest portal and was skimming to a stop in the middle of the parade ground. Bullard knew at once from its dark-green color that it belonged to the State Department, and from the golden insignia it sported that it was the personal car of a very high official. He frowned speculatively at that, for experience had taught him that unscheduled visits from diplomatic bigwigs invariably meant trouble. Their contempt for the Service was notorious—they haughtily ignored the uniformed men until their own muddlings sometimes brought affairs to such a pass that there was nothing left but to call in men of action to strengthen their hand.

"Wonder what this bird wants?" growled Bullard, watching the man alight from the machine. "If it's a snappy warship for a dirty job, he won't get it. There aren't any." Then he put on his best poker face, recrossed the room, and sat down to await his caller.

"I," announced the caller, exuding pomposity and incompetence from every pore, "am Lionel Wallowby, Undersecretary of State for Asteroidal Affairs. My calling on you, rather than sending for you, though unprecedented—"

"I am honored," said Bullard, bowing stiffly, but without a quiver of expression. Now he knew whom he had to deal with, for Wallowby's name was a byword, and he knew that the interview was not going to be an easy one. Fellow officers who had dealt with the man com-

plained afterward that the strain of holding themselves in was almost intolerable. Not that Wallowby was a villain, or even malicious. He was simply smug, vain, useless—an outstanding example of what nepotism at its worst can foist upon a suffering public.

"I come about a matter of great urgency which will require your immediate intervention."

"How can anything be urgent in these placid times?" asked Bullard bitterly, "and if so what can I do about it? Article VIII of the Treaty of Juno—of which, if my memory is not at fault, you were one of the drafters—forbids forever the use of force or the threat of force in any situation whatever, regardless of provocation. Isn't that correct?"

"Uh, yes," admitted Mr. Wallowby, squirming in his seat, "but there are aspects of the situation in hand that make it exceptional. You see, it is the attitude of the Trojans. It is distressing. Humiliating. They sidestep, fence, and quibble. We have reached an impasse. An exasperating people, really."

"Quite!" said Bullard. He could think of a hundred adjectives applicable to them, all harsher. Exasperating, indeed! On the gray rocks of those far-off groups of asteroids lived the lowest and meanest dregs of mankind. Their rulers were fugitive shyster lawyers, disbarred from more decent planets. Their "aristocracy" were retired pirates and gamblers, their "working" populace a medley of every type of petty crook from pickpocket

to cutthroat. Their very existence as a quasi-independent nation was a reproach to civilization.

"They take every advantage of their privileged international status," complained Mr. Wallowby.

"They would," said Bullard, dryly. "And why not?"

It was a dig at his caller, for it was Undersecretary Wallowby who had held out at the peace conference for the continued autonomy of the Trojans, alleging that to leave them as they were was the simplest evasion of the age-old rivalry between the Martians and the colonists on the Saturnian satellites. And so it might have been had the Trojans been populated by any other kind of people. But as it turned out, "autonomy," as construed by the bosses of the Trojans meant license to thumb their noses at the rest of the civilized world. They owed their immunity to subjugation to their peculiar location in the Solar System. Both groups rode the orbit of Jupiter, one a half billion miles ahead, the other an equal distance behind the master planet. Therefore, the Jovians periodically made claim for jurisdiction. But there are years when Saturn is actually closer to one or the other of them, and often Mars is closer to both. From the earliest asteroid-grabbing days Mars and Saturn had quarreled over which had the primary interest. The nearsighted framers of the Treaty of Juno had ducked the issue by leaving the Trojan groups autonomous, but yet under the joint protection of both squabbling claim-

ants. Whereupon the Trojans promptly made the most of it.

Bullard knew the rocky planetoids well, for he had visited them often in the days when manhunters were not handicapped by paralyzing rules. He knew the men who ran them, particularly the swashbuckling fourflusher who styled himself the Boss of Nestor. Since he had defied him more than once in cutting out some wanted man. But those good old days were gone. Nowadays the Trojans wrapped themselves in the blessing of the no-violence terms of the fatuous treaty. No one could enter their ports forcibly, or remove any criminal fugitive without their consent—not even one of their own protectors. Should Mars make harsh claims, the Trojans would appeal to the Saturnians, who in turn, could be counted upon to declare the Martians in the wrong. Or they would work it the other way around. On the other hand if the Earth or any other outside planet presented a claim or grievance, both protectors would be called in. The Trojans played both ends against the middle with great skill. Their position resembled that of certain small Balkan countries at an earlier period in history—they were of little intrinsic worth but of high nuisance value. The least upsetting of the *status quo* could easily initiate another general war. The Trojan situation, in short, was dynamite.

"What is your difficulty with the Trojans?" Bullard asked, see-

ing that Wallowby seemed at a loss to proceed. "What do you want of me?"

"I . . . uh, that is we . . . or the Department, I meant to say," stammered Wallowby, "find we are compelled to ask you to extricate . . . no, that isn't what I mean . . . execute a delicate diplomatic mission. It has to do with a notorious criminal known as Grory the Groat. We have extradited him and now want to secure custody."

"I have no ships in commission here," remarked Bullard, "whereas skyliners make the trip every month. Furthermore, you have a large staff of marshals who are maintained for just such missions. The apprehension of a civil prisoner is outside my jurisdiction." He had not missed Wallowby's fumbling of the word "extricate," and already guessed the civil arm had made a try for Grory and messed it up. Wallowby's capacity for bungling was unsurpassed.

"The Trojans do not treat our marshals with respect," whined Wallowby. He was not used to being talked back to, and he did not like to admit what he had to. "We have sent several, but they are always turned back on one legalistic pretext or another. In our first requisition we claimed Grory on charges of treason, sabotage, fomenting rebellion, and gun-running. They accepted it, but when our officer got there they told him that they had reconsidered. It appears that the crimes enumerated were not sufficient in view of the blanket amnesty clause in the Treaty."

"Of course not," said Bullard bluntly. "They have a political tinge. You should have known better. Isn't that general amnesty clause known widely as the Wallowby Provision?"

Wallowby flushed, then turned huffy.

"It was never intended to give immunity to common scoundrels of the Grory stripe," he said stiffly. "Moreover the treaty is not what I came to discuss."

Bullard shrugged. Wallowby went on.

"Since then we have submitted other requests. Five, to be exact. We have presented evidence of piracy, murder and embezzlement. We have demanded him for smuggling drugs and white slaves, for counterfeiting, and a score of other crimes. Each time they say we may have him if we only send. Each time our marshal arrives there they send him back emptyhanded, always with a different excuse. To make the story short, they are evasive and unco-operative. They have persistently refused to arbitrate. They flout us, admiral they flout us!" It was a wail.

"Maybe they don't *want* to give up Mr. Grory the Groat," said Bullard.

Wallowby looked momentarily startled as if that suggestion was entirely novel to him. Then he rallied himself and completed his oration.

"We have been correct, considerate and courteous throughout. They repay us with legal sophistries. We have dilly-dallyed overlong. My

patience is at its end. The hour for action has struck. Now the time has come when we must reveal the iron hand that lies beneath the velvet glove—”

“What iron hand?” asked Bullard brutally.

Wallowby blinked and swallowed hard.

“Why, uh, the *potential* iron hand, of course. We must be more impressive. We must be more stern. We must cease making request and make *demands*. You will at once send a warship to Nestor and secure the person of this Grory for us.”

“That,” said Bullard, rising, “is absolutely absurd. The only ships we have that can take the void have been thoroughly demilitarized. Even if they were armed, we are still forbidden by the terms of your ridiculous treaty from using them. What, I ask, can a gunless battleship do that a letter can’t do?”

“You are impertinent, *Acting Admiral Bullard*,” said Wallowby with what was meant to be cutting sarcasm. He, too, was on his feet, and his face aflame. “I have wasted words enough on you. Here are your orders. Carry them out.”

He jerked a long official envelope from an inner pocket and hurled it onto Bullard’s desk. Then, after venting one contemptuous sniff, stalked haughtily out.

“Well, I’ll be—” whistled Bullard as the door closed on the back of his departing caller.

He sat for long, staring down at those silly orders and marveling at the incredible stupidity of a man

such as Wallowby. Yet, he asked himself after a time, was he so stupid after all? However he might bungle jobs, he had cunning enough to find an out. The suspicion was growing in Bullard’s mind that this time it was he who had been chosen for the goat. He glanced through the orders again.

They were official enough, having been signed in open council by no lesser personage than the Director himself. And they were simple. They directed that a demilitarized man-of-war be put in commission at once and sent under the command of a competent officer to the port of Nestor in the Anterior Trojans. Upon arrival the ship’s captain was to make peremptory demand upon the Boss of Nestor for the person of one Grory the Groat, receive him into custody, and deliver him to the appropriate authorities on Earth. The demand was to be made in the name of interplanetary law only and was not to be accompanied by threatening words or gestures. If refused, no efforts were to be made to apprehend Grory by force. In the latter event, the visiting officer was to politely withdraw and return to Luna.

“Nuts!” snorted Bullard, kicking his swivel chair out from under him and beginning a feverish pacing of the room. For five minutes he angrily strode up and down, cursing Wallowby without cessation. For now his dilemma was crystal clear. Wallowby, the louse, didn’t matter any longer. He had adroitly ducked from under. The thing was official now. Whatever

the stupidities and ineptness of the Office of Asteroidal Affairs, they had been buried, white-washed, glossed-over, or what have you. The mess had been laid in Bullard's lap. It was his baby now. Worse, it was the Service's baby.

If and when the affair was ever made public, the story would run thus: Justice located their man; State put through the necessary requests and papers; Space Service was assigned to execute the ultimate act of physical possession. Whether or not they got the man would be irrelevant. The two civil departments had done their stuff, if blame was due it was due somewhere else.

"Heads he wins, tails I lose," growled Bullard. "If we get Grory, it is no more than we are expected to do—a routine matter; if we don't get Grory, we're a pack of bums. There isn't but one answer. No stuffed shirt like Wallowby is going to make this outfit a laughingstock as long as I'm giving the orders. *I'm going to get Grory.*"

He sat down to gather himself together and think of ways and means. The more he contemplated the problem, the thicker it got. Wallowby's legal sharks had done their best—and failed; his diplomats had made representations, argued and pleaded—and had failed; his marshals had been received with ridicule, and sent back defeated. But that, after all, was the Wallowby crowd. Bullard's eyes grew hard. He knew offhand of at least forty officers on the Moon he could send who would bring back Grory

dead or alive, and the blustering Boss of Nestor, too, if it came to that, if only told to do so. But Bullard could not order them out. His hands were bound by the let-the-lamb-lie-down-with-the-lion platitudes of the accursed Treaty of Juno. No longer could a Guardsman look a hardboiled criminal in the eye and say, "Put 'em up, or else." Oh, no. You should approach the rogue politely and request he accompany you to the jail. Bah! That time Bullard picked up his chair and hurled it clear across the room. After that he took up his tigerish rug tramping again.

All the answers were negative. If he didn't bring Grory back, he would have furnished Wallowby with the alibi he sought. If he brought him back through the use of, or by the barest hint of force, a delicate interplanetary situation would be provoked. The Martians and Saturnians would be certain to protest it as a violation of the treaty, and again the blame would fall upon Bullard's man for having been over zealous. It might not result in a resumption of the war, but it was as risky as smoking in a powder magazine.

Spent from his excited pacing, Bullard sat down again. This time he discarded all the usual approaches and went at the problem in his own way. There had been other times in his life that he had received asinine, if not impossible orders, and had managed somehow to carry them into execution, though, it must be admitted in all frankness, not always to the perfect satis-



faction of those who had issued them. Now he must wrack his brains again.

He scanned the list of ships present and the roster of personnel. The choice of ships was easy. He selected the ex-cruiser *Llerdyx*, a prize of war, for the vessel. Her guns had been pulled and the ports blanked off, and her torpedo tubes plugged beyond repair, but she was handy and fast and that was all he wanted. Bullard sent orderlies scurrying with word to various departments. The *Llerdyx* was to be renamed the *Texas Ranger*, provisioned and fueled and made ready for departure the following day.

Her crew was to be made up of *Pollux* men then waiting in the lonely barracks by the Gobi dock.

All of Bullard's best officers were away on extended leave, but at length he found a notation on the roster that gave him comfort. Lieutenant Benton, whom he had fleeted up from tubeman, was due back on Luna that very night. Benton then was the man, for Benton could be relied upon. That disposed of the expedition except provision for what it was to do. That was the hardest task.

He sat down at the ordergraph. His fingers flew as he pecked out part one of the orders. They were largely a paraphrase of the set Wallowby brought. Then the going got hard; Bullard bogged down. He swore softly to himself, scowled, wrote pages and pages of drafts, only to tear them up and feed them into the maw of his wastebasket. He would light one cigarette on the butt of its predecessor, then grind it angrily under his heel. It was one thing to write orders that could be complied with, another to compose a set in the face of almost certain failure. It was like ordering a faithful follower to go up against a ruthless killer with nothing but an empty gun.

Dark was almost at hand when Bullard finally wrote out the words he dreaded to put down. But he did write them out, for his duty was plain. They would be painful for Benton to execute, and disgraceful for Bullard if they were ever made known. But the feelings and reputations of two men did not

count in the grander scheme of things. Very reluctantly Bullard inserted the paper in an envelope, sealed it with a sigh, then typed on the cover these words:

To be opened and put into effect only in the event that the Boss of Nestor refuses to hand over the person of Grory the Groat. Otherwise this must be returned to signer intact.

Bullard.

An hour later Benton reported for duty, brisk, cheerful and ruddy after his vacation. But his grin faded when he saw the somber mood of his skipper. Bullard hardly spoke. Instead he handed over part one of the orders.

"Gee!" said Benton, delighted. "I get a command. And do a cruise all on my own. That's great!"

"Evidently you do not understand what you are to do," said Bullard, gravely.

"Sure. It's clear enough. I hop off tomorrow, go out to Nestor, tell 'em I want this bird Grory, slap him in the brig, and then come back. What's the catch?"

"They aren't going to give Grory up."

"Huh?" Benton was astonished. Then his face widened as his old grin came back. Now he knew—Bullard was having a little private fun, he was pulling his leg. "Why that flea-bitten little so-called republic. For two cents I'd blast 'em out of the ether, no matter what they've got."

"That," said Bullard, "is the hard part. You aren't permitted to do any blasting. You haven't any arms but

sidearms. And they know it."

"All right. They say no. Then what do I do? Come home like a whipped hound?"

Bullard drew the secret portion of the orders out of his desk drawer and fondled its envelope thoughtfully.

"You will find the answer here," he said. "This will tell you all you need to know."

Bullard got up abruptly and walked to the window, where he stood for a moment looking out into the dim night, his hands clasped behind him. Benton saw that his fingers were twitching nervously, and was surprised, for he had seldom seen the celebrated captain of the *Pollux* display strong emotion. Then Bullard began speaking again, but still facing out the window. His tone was low and his voice solemn.

"Benton, lad, there is something I want you to remember when you get out there on Nestor. That is that I am sending you on this mission only because I am forbidden to take it myself. The darkest hours in any senior's life come when he is compelled to delegate a job so dirty that he would shrink from touching it himself. This job, Benton, is that kind of job. If the worst comes and you *have* to open this envelope, you will have no choice but comply with its harsh instructions. You will want to squirm out from under, you will want to rebel, you will hate me—"

"Oh, no, skipper," exclaimed Benton. "I can carry out orders. You know it!"

"To the letter, whatever the cost, whatever your opinion of the orders themselves or the man who wrote them?"

"Why, yes, sir. What proper officer would not?"

Bullard whirled, and Benton thought he caught a twinkle in his eyes, though the mouth still held its grim set.

"There have been times, Benton," Bullard said softly, with a faint smile, "when officers have not always adhered to the *letter*. In fact, on several such occasions I believe you acted as an accomplice." Then his face grew stern again, and the voice peremptory and commanding. "In this instance you are to attempt nothing of the sort. Orders are orders."

He handed Benton the sealed package. Then he shook him warmly by the hand. Benton looked so crestfallen that Bullard was beginning to wonder if he had not overplayed his hand.

"If you work things right," said Bullard, in a more confident tone, "you will bring this back unopened along with Grory. I cannot tell you in advance what my instructions are, but I assure you that I have prepared for every conceivable contingency. The only hints I can give you are these: be cool and civil; do not bluster or enter into a debate. But be bold, be confident when you make your demand. If it is refused, go back quietly to the ship and wait. If nothing happens by the expiration of four hours, then you will have to do what I have written here. Good luck!"

Many times on the trip out Benton took the mysterious envelope out of the safe and examined it hopefully. There was no clue to what it contained. As often he put it back, more curious than ever. His confidence in Bullard was unbounded; he was sure of one thing, and that was that those hidden orders *did* have the answer to anything that might come up. But what? Bullard had intimated that carrying them out would be distasteful, perhaps hazardous. Oh, well!

Benton went through the ship with a fine-toothed comb, looking for secret gadgets that might have been planted there. He found nothing. Whatever Bullard expected him to do was probably in the strictly Bullardian manner—a pulling of rabbits out of a hat. He was still puzzling over the teaser when the Trojan group showed up on his screen. A little later he was setting the newly christened *Texas Ranger* down on Nestor.

When he stepped out of the space lock he saw to his surprise that he had company. A Martian gunboat, bristling with long Zordich guns, lay to his left; a Saturnian sloop of war, studded with tube openings, lay to the right. An armed yacht, sporting the triple-cross emblem of the Trojans, was a little way ahead of where he lay. It was apparent that the denizens on the outer planets were not taking disarmament as seriously as the gullible Earth people. It was very disconcerting.

Then Benton thought of his orders inside in the safe. It bucked

him up. No doubt the presence of these vessels was one of the contingencies that Bullard had provided for. Bullard was a careful man. Benton walked on toward the port.

His interview with the Boss of Nestor was short and to the point. He stated what he had come for; the answer was a curt no. That was all there was to it.

"Very well," said Benton, calmly. Bullard's words still rang in his ears—"be confident, be cool, be bold."

Someone in the audience chamber snickered, but Benton ignored it. He walked down the aisle and out the door with a firm step but without haste. At the door the Nestorian captain of the port who had escorted him to the palace took him back in tow.

"You take it easier than the marshals did," he said, in an offhand way. "They raved and swore. But it didn't get 'em anywhere. Our Boss is tough."

"Yeah?"

"Yes. Are you shoving off now?"

"Oh, no," said Benton. "I haven't finished yet."

They walked along for a hundred yards while the beetle-browed captain mulled that cryptic remark over. At length he asked for enlightenment.

"You came for Grory and the Boss said you couldn't have him? So what? Bluffs don't work on Nestor."

"I wouldn't know."

"Then what? What have you got up your sleeve?"

"You'll find out in just four hours from now—if I don't get Grory."

"Oh, a threat, huh?"

"Nope. A statement."

The port captain left Benton at his ship, then walked across to the Martian vessel and said something to its skipper. Then Benton saw him making his way toward the Saturnian. Benton called for his steward.

"Bring out that fancy deck chair we found in the cabin," he directed.

Ten minutes later Benton was stretched out in a luxurious silken chair over which a striped awning made a canopy against the weak Nestorian sun. By his side stood a taboret and on it a tall, cool drink. Benton relaxed. It was his way of displaying confidence.

Presently the Martian captain came over, read the name of his ship, looked enviously at the fancy chair layout, then opened the conversation.

"Sticking around awhile?"

"Dunno," said Benton. "That's up to the Boss. When I get Grory, I shove off."

The Martian asked several more questions, but the answers were vague and noncommittal. The conversation languished. Benton glanced at his watch. An hour had gone. He took a sip of his drink, closed his eyes and pretended to doze.

The Martian went away. Half an hour later Benton had a new visitor. It was Nestor's deputy Boss, a scarred, one-eyed ex-burglar named Fraggin.

"What's this about an ultimatum?" he demanded roughly. "Captain Zeeter said you said you were going to get Grory inside of four hours or else."

"He quoted me inaccurately, but that was the substance of it."

"Or else what?" Fraggin looked like he was about to swing.

"When the time limit expires I shall carry out the uncompleted portion of my orders. That's all. What's in 'em is my business."

"Who wrote any such orders?" growled Fraggin.

"That's none of your business either, but I don't mind telling you. Bullard did—Admiral Bullard, Commandant of Lunar Base and captain of the *Pollux*. You ought to know him. He pulled the raid on Titania."

"Yeah, yeah, I know him," said Fraggin, rubbing one of his scars thoughtfully. There was not a man in all the Trojans that didn't know him. Most had been arrested by him at one time or another.

"Well," said Fraggin after a long and what must have been for him a painful silence, "I gotta be goin'!"

"O.K.," said Benton, serenely, and reaching for his drink. "I'll be seeing you." Then he settled down to do some concentrated, if well concealed, worrying. At that moment he would gladly have given a pair of fingers for some advanced knowledge of what that sealed envelope held. He felt that he should be making preparations, not dawdling in a silky chair. But he knew he was being watched intently from three ships, and now that he had

chosen his role he must stick it out to the bitter end.

It still lacked ten minutes to the deadline when the squad of soldiers approached. Fraggin led them. Benton glanced up with a pretense of indifference, and then a great weight rolled off his soul. Struggling and cursing in the midst of the squad was the man Grory, handcuffed to the soldiers on either side of him. Benton turned his head and called the steward.

"Ask the master-at-arms to come out," he said. "Here comes our prisoner."

The exchange of formal papers took only a few minutes. Then the *Texas Ranger*'s tubes began to glow and a little later she was in the void, headed home. Benton decided to while the time away by refreshening his astragation. Working out the sights made the days of the voyage pass quickly. Almost before he realized it, he was making his landing on Luna.

A prison van from Justice was there to meet him, and Benton took the receipt for Grory from an astonished looking chief marshal. He declined to answer any questions, but the moment he was rid of his prisoner, he hurried over to the Administration Building.

"Well done," said Bullard, meeting him at the door. "I knew you could do it. Any trouble?"

"Not a bit," said Benton, proudly, then to make the most of his brief spot in the limelight, produced the envelope still bearing its seals. "I didn't even have to use this, sir."

"Ah, splendid," said Bullard, taking it and dropping it in the drawer. "You may go back to your regular duties now, Benton, and thank you."

"Yes, sir, of course. But I am a little curious. You may not know it, sir, but I was worried. I'm itching to know what those orders were."

Bullard looked at him quizzically. Should he tell him? After all he had been put in an awful hole and had come through with flying colors. Bullard felt he rated something. He would have preferred that Benton never knew, but he had asked, and it was a request that was hard to deny.

"All right, Benton, here you are. Here is the shameful thing you might have had to do."

"Shameful?" said the amazed Benton, taking the envelope and pulling off its seals. Bullard watched him intently as he shook out the contents and fished through them. Benton had expected to find several pages of closely written instructions. Instead he found only sheets of blank paper. Then, in the middle, he found a little slip of paper on which were written three brief words.

"Great God!" he cried, as the enormity of it hit him. He stared at the terse sentence in frank disbelief. Then he laughed. The paper fluttered onto Bullard's desk where the three little words lay until Bullard tore them into fine little bits. The words were:

RETURN TO BASE.

THE END.

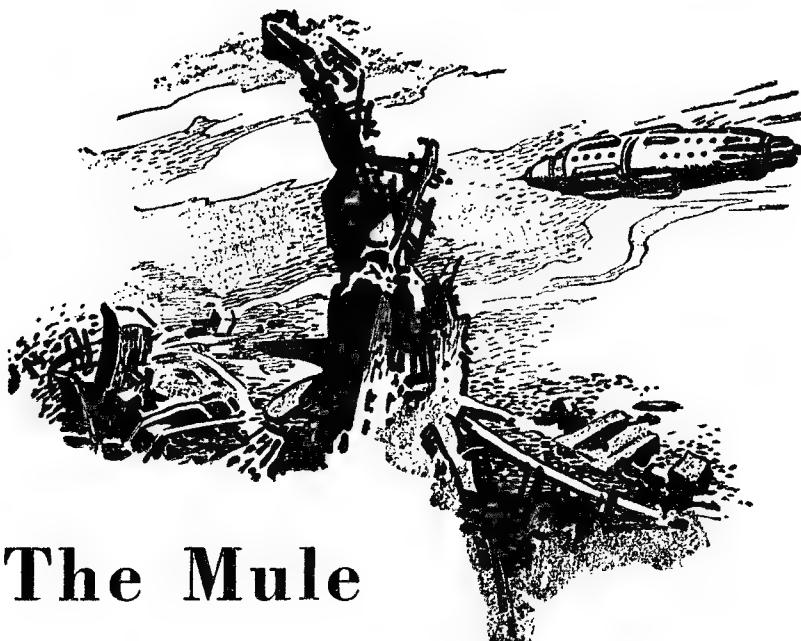
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The Mule

by ISAAC ASIMOV

Second of two parts. Across the ruined, dying Galactic Empire, fleeing from a conquered Foundation, three frightened people and the hunted jester of the new conqueror, the Mule, sought the Second Foundation—the only hope, but it must be warned!

Illustrated by Orban

SYNOPSIS

The Foundation, having defeated the Empire in the final Imperial attempt at conquest nearly a century earlier, has developed, meanwhile, into a tight oligarchy. The mayor's office has become hereditary, and Indbur III, the weakling autocrat who now rules, is merely a tool in the hands of the huge financial magnates.

Against this state of affairs stand the twenty-six small, disunited Independent Trading Worlds which were established by the fleeing rebels after the unsuccessful Traders Rebellion eighty years before. These worlds have not abandoned thoughts of revolt but are far too weak to change thoughts to action.

Meanwhile, the old Empire has fallen quite to pieces, with the various splinters under the shifting,

incoherent control of successions of warlords, whose ephemeral military rule waxes and wanes chaotically. It is to these warlords that certain elements of the Independent Traders look for help against the Foundation. However, none of these warlords are at all anxious to tangle with a Foundation known to have defeated the Empire singlehanded and known to be invincible by the established laws of psychohistory.

There is only "The Mule." The Mule is an unknown figure who, in the space of a few years has sprung to the forefront of the warlord ranks and whose realm has grown with startling speed, though he himself is as much a mystery as ever. As the story opens, he has just captured the planet of Kalgan without a fight, though its former warlord was known to be a capable warrior, entirely ungiven to surrender.

It is upon the Mule, then, that the eyes of Haven, largest of the Independent Trading Worlds, are fixed. Toran, nephew of one of Haven's leaders, and his Foundation bride, Bayta, travel to Kalgan, ostensibly for a honeymoon, actually to establish contact with the Mule. There, they rescue a runaway clown of the Mule's from imminent recapture in defiance of the Mule's men. Through him, they hope to reach the Mule.

That night, however, Captain Han Pritch, of the Foundation Intelligence, meets them, reveals his own pro-democratic sympathies convincingly, and advances his theory that the Mule is a mutant

of unknown powers who is a great potential menace to the entire Galaxy, and who may have been unaccounted for in the original master-plan of the Foundation's psycho-history as set up three centuries earlier by the great scientist, Hari Seldon. Captain Pritch suggests the union of the Foundation and the Independent Traders against the common menace.

Toran and Bayta leave Kalgan with Captain Pritch and the Mule's clown, without any interference at all from the Mule, but upon arriving at the Foundation find that the Mule has used the abduction of his clown as a pretext to declare war on the Foundation. This suddenly bears out the theories of the pro-democratic Ebling Mis, the Foundation's greatest psychologist, who has predicted an imminent appearance in the Time Vault of the recorded figure of Hari Seldon, founder of the Foundation. This is rightly taken to mean the approach of a severe crisis and every effort is made, but unsuccessfully, to obtain information concerning the nature of the Mule's mutant powers from the limited mental faculties of the Mule's grotesque clown.

The Independent Trading Worlds have, in the meantime, convened, and are trying to form an alliance with the Mule. Efforts to reach him fail, however, and when he attacks one of the Independent Trading Worlds without provocation, the Trading Worlds realize the real power and danger of the Mule and

hastily throw in with the Foundation.

Surprisingly, the Mule, with new ships and weapons of his own, wins initial victories.

All depends now upon the Time Vault. In the past, Hari Seldon has always appeared at times of crises to explain his psychohistorical laws, which have so set up the Foundation, as to force it through a series of crises on to eventual galaxy-wide Empire a thousand years later. These laws are considered, and have so far proved to be, foolproof.

This time, unfortunately, with the enemy at the approaches to the Foundation's home planet, the simulacrum of Hari Seldon makes no mention of the Mule, but discusses instead a Traders Rebellion—which had never occurred—which he refers to as being safely beaten down. It is obvious that Seldon's psychohistory had not foreseen the current crisis correctly and great consternation arises among the assembled notables of the Foundation.

In the middle of Seldon's speech, all atomic power on the Foundation is shut off by a newly-developed device of the Mule and in the despair that follows, Indbur III surrenders the Foundation to the Mule.

Toran and Bayta, together with their uncle, Randu, the clown, Magnifico, and the Foundation psychologist, Ebling Mis, escape to Haven, which in common with most of the Independent Worlds still resists.

The next day the forces of the Mule land, and for the first time in its history, the Foundation is actu-

ally conquered and placed under foreign domination.

IX.

The lonely planet, Haven—only planet of an only sun of a Galactic Sector that trailed raggedly off into intergalactic vacuum—was under siege.

In a strictly military sense, it was certainly under siege, since no area of space on the Galactic side further than twenty parsecs distance was outside range of the Mule's advance bases. In the four months since the shattering fall of the Foundation, Haven's communications had fallen apart like a spiderweb under the razor's edge. The ships of Haven converged inwards upon the home world, and only Haven itself was now a fighting base.

And in other respects, the siege was even closer; for the shrouds of helplessness and doom had already invaded—

Bayta plodded her way down the pink-waved aisle past the rows of milky plastic-topped tables and found her seat by blind reckoning. She eased on to the high, armless chair, answered half-heard greetings mechanically, rubbed a wearily-itching eye with the back of a weary hand, and reached for her menu.

She had time to register a violent mental reaction of distaste to the pronounced presence of various cultured-fungus dishes, which were considered high delicacies at Haven, and which her Foundation taste found highly inedible—and then she

was aware of the sobbing near her and looked up.

Until then her notice of Juddie, the plain, snub-nosed, indifferent blonde at the dining unit diagonally across had been the superficial one of the nonacquaintance. And now Juddie was crying, biting woefully at a moist handkerchief, and choking back sobs until her complexion was blotched with turgid red. Her shapeless radiation-proof costume was thrown back upon her shoulders, and her transparent face shield had tumbled forward into her dessert, and there remained.

Bayta joined the three girls who were taking turns at the eternally applied and eternally ineffectual remedies of shoulder-patting, hair-smoothing, and incoherent murmuring.

"What's the matter?" she whispered.

One turned to her and shrugged a discreet, "I don't know." Then, feeling the inadequacy of the gesture, she pulled Bayta aside.

"She's had a hard day, I guess. And she's worrying about her husband."

"Is he on space patrol?"

"Yes."

Bayta reached a friendly hand out to Juddie.

"Why don't you go home, Juddie?" Her voice was a cheerfully businesslike intrusion on the soft, flabby inanities that had preceded.

Juddie looked up half in resentment, "I've been out once this week already—"

"Then you'll be out twice. If you try to stay on, you know, you'll

just be out three days next week—so going home now amounts to patriotism. Any of you girls work in her department? Well, then, suppose you take care of her card. Better go to the washroom first, Juddie, and get the peaches and cream back where it belongs. Go ahead! Shoo!"

Bayta returned to her seat and took up the menu again with a dismal relief. These moods were contagious. One weeping girl would have her entire department in a frenzy these nerve-torn days.

She made a distasteful decision, pressed the correct buttons at her elbow and put the menu back into its niche.

The tall, dark girl opposite her was saying, "Isn't much any of us can do except cry, is there?"

Her amazingly full lips scarcely moved, and Bayta noticed that their ends were carefully touched to exhibit that artificial, just-so half-smile that was the current last word in sophistication.

Bayta investigated the insinuating thrust contained in the words with lashed eyes and welcomed the diversion of the arrival of her lunch, as the tile-top of her unit moved inward and the food lifted. She tore the wrappings carefully off her cutlery and handled them gingerly till they cooled.

She said, "Can't *you* think of anything else to do, Hella?"

"Oh, yes," said Hella. "I can!" She flicked her cigarette with a casual and expert finger-motion into the little recess provided and the

tiny atom-flash caught it before it hit shallow bottom.

"For instance," and Hella clasped slender, well-kept hands under her chin, "I think we could make a very nice arrangement with the Mule and stop all this nonsense. But then I don't have the . . . uh . . . facilities to manage to get out of places quickly when the Mule takes over."

Bayta's clear forehead remained clear. Her voice was light and indifferent. "You don't happen to have a brother or husband in the fighting ships, do you?"

"No. All the more credit that I see no reason for the sacrifice of the brothers and husbands of others."

"The sacrifice will come the more surely for surrender."

"The Foundation surrendered and is at peace. Our men are away and the Galaxy is against us."

Bayta shrugged, and said sweetly, "I'm afraid it is the first of the pair that bothers you." She returned to her vegetable platter and ate it with the clammy realization of the silence about her. No one in ear-shot had cared to answer Hella's cynicism.

She left quickly, after stabbing at the button which cleared her dining unit for the next shift's occupant.

A new girl, three seats away, stage-whispered to Hella, "Who was she?"

Hella's mobile lips curled in indifference, "She's our co-ordinator's niece. Didn't you know that?"

"Yes?" Her eyes sought out the

last glimpse of disappearing back. "What's she doing here?"

"Just an assembly girl. Don't you know it's fashionable to be patriotic? It's all so democratic, it makes me retch."

"Now, Hella," said the plump girl to her right. "She's never pulled her uncle on us yet. Why don't you lay off?"

Hella ignored her neighbor with a glazed sweep of eyes and lit another cigarette.

The new girl was listening to the chatter of the bright-eyed accountant opposite. The words were coming quickly, "—and she's supposed to have been in the Vault—actually in the Vault, you know—when Seldon spoke—and they say the mayor was in frothing furies and there were riots, and all of that sort of thing, you know. She got away before the Mule landed, and they say she had the most tha-rilling escape—had to go through the blockade, and all—and I do wonder she doesn't write a book about it, these war books being so popular these days, you know. And she was supposed to be on this world of the Mule's, too—Kalgan, you know—and—"

The time bell shrilled and the dining room emptied slowly. The accountant's voice buzzed on, and the new girl interrupted only with the conventional and wide-eyed, "Really-y-y-y?" at appropriate points.

The huge cave lights were being shielded group-wise in the gradual descent towards the darkness that

meant sleep for the righteous and hard-working, when Bayta returned home.

Toran met her at the door, with a slice of buttered bread in his hand.

"Where've you been?" he asked, food-muffled. Then, more clearly. "I've got a dinner of sorts rassled up. If it isn't much, don't blame me."

But she was circling him, wide-eyed, "Torie! Where's your uniform? What are you doing in civvies?"

"Orders, Bay. Randu is holed up with Ebling Mis right now, and what it's all about, I don't know. So there you have everything."

"Am I going?" She moved towards him impulsively.

He kissed her before he answered, "I believe so. It will probably be dangerous."

"What isn't dangerous?"

"Exactly. Oh, yes, and I've already sent for Magnifico, so he's probably coming, too."

"You mean his concert at the Engine Factory will have to be canceled."

"Obviously."

Bayta passed into the next room and sat down to a meal that definitely bore signs of having been "rassled-up." She cut the sandwiches in two with quick efficiency and said:

"That's too bad about the concert. The girls at the factory were looking forward to it. Magnifico, too, for that matter. Darn it, he's such a queer thing."

"Stirs your mother-complex, Bay, that's what he does. Some

day we'll have a baby, and then you'll forget Magnifico."

Bayta answered from the depths of her sandwich, "Strikes me that you're all the stirring my mother-complex can stand."

And then she laid the sandwich down, and was gravely serious in a moment.

"Torie."

"Mm-m-m?"

"Torie, I was at City Hall today—at the Bureau of Production. That's why I was so late today."

"What were you doing there?"

"Well . . ." she hesitated, uncertainly. "It's been building up. I was getting so I couldn't stand it at the factory. Morale—just doesn't exist. The girls go on crying jags for no particular reason. Those who don't get sick become sullen. Even the little mousie types pout. In my particular section, production isn't a quarter what it was when I came, and there isn't a day that we have a full roster of workers."

"All right," said Toran, "tie in the B. of P. What did you do there?"

"Asked a few questions. And it's so, Torie, it's so all over Haven. Dropping production, increasing sedition and disaffection. The bureau chief just shrugged his shoulders—after I had sat in the anteroom an hour to see him, and only got in because I was the co-ordinator's niece—and said it was beyond him. Frankly, I don't think he cared."

"Now, don't go off base, Bay."

"I don't think he did." She was strenuously fiery. "I tell you there's

something wrong. It's that same horrible frustration that hit me in the Time Vault when Seldon deserted us. You felt it yourself."

"Yes, I did."

"Well, it's back," she continued savagely. "And we'll never be able to resist the Mule. Even if we had the materiel, we lack the heart, the spirit, the will— Torie, there's no use fighting—"

Bayta never had cried in Toran's memory, and she did not cry now. Not really. But Toran laid a light hand on her shoulder and whispered, "Suppose you forget it, baby. I know what you mean. But there's nothing—"

"Yes, there's nothing we can do! Everyone says that—and we just sit and wait for the knife to come down."

She returned to what was left of her sandwich and tea. Quietly, Toran was arranging the beds. It was quite dark outside.

Randu, as newly-appointed coordinator—in itself a wartime post—of the confederation of cities on Haven, had been assigned, at his own request, to an upper room, out of the window of which he could brood over the roof tops and greenery of the city. Now, in the fading of the cave lights, the city receded into the level lack of distinction of the shades. Randu did not care to meditate upon the symbolism.

He said to Ebling Mis—whose clear, little eyes seemed to have no further interest than the red-filled goblet in his hand— "There's a saying on Haven that when the cave

lights go out, it is time for the righteous and hard-working to sleep."

"Do you sleep much lately?"

"No! Sorry to call you so late, Mis. I like the night better somehow these days. Isn't that strange? The people on Haven condition themselves pretty strictly on the lack of light meaning sleep. Myself, too. But it's different, now—"

"You're hiding," said Mis, flatly. "You're surrounded by people in the waking period, and you feel their eyes and their hopes on you. You can't stand up under it. In the sleep period, you're free."

"Do you feel it, too, then? This miserable sense of defeat?"

Ebling Mis nodded slowly, "I do. It's a mass psychosis, an unprintable mob panic. Ga-LAX-y, Randu, what do you expect? Here you have a whole culture brought up to a blind, blubbering belief that a folk hero of the past has everything all planned out and is taking care of every little piece of their unprintable lives. The thought-pattern evoked has characteristics *ad religio*, and you know what that means."

"Not a bit."

Mis was not enthusiastic about the necessity of explanation. He never was. So he growled, stared at the long cigar he rolled thoughtfully between his fingers and said, "Characterized by strong faith reactions. Beliefs can't be shaken short of a major shock, in which case, a fairly complete mental disruption results. Mild cases—hysteria, morbid sense of insecurity. Advanced cases—madness and suicide."

Randu bit at a thumbnail, "When Seldon fails us, in other words, our prop disappears, and we've been leaning upon it so long, our muscles are atrophied to where we cannot stand without it."

"That's it. Sort of a clumsy metaphor, but that's it."

"And you, Ebling, what of your own muscles?"

The psychologist filtered a long draught of air through his cigar, and let the smoke laze out, "Rusty, but not atrophied. My profession has resulted in just a bit of independent thinking."

"And you see a way out?"

"No, but there must be one. Maybe Seldon made no provisions for the Mule. Maybe he didn't guarantee our victory. But, then, neither did he guarantee defeat. He's just out of the game and we're on our own. The Mule can be licked."

"How?"

"By the only way anyone can be licked—by attacking in strength at weakness. See here, Randu, the Mule isn't a superman. If he is finally defeated, everyone will see that for himself. It's just that he's an unknown, and the legends cluster quickly. He's supposed to be a mutant. Well, what of that? A mutant means a 'superman' to the ignoramuses of humanity. Nothing of the sort.

"It's been estimated that several million mutants are born in the Galaxy every day. Of the several million, all but one or two percent can be detected only by means of microscopes and chemistry. Of the

one or two percent macromutants, that is, those with mutations detectable to the naked eye or naked mind, all but one or two percent are freaks, fit for the amusement centers, the laboratories, and death. Of the few macromutants whose differences are to the good, almost all are harmless curiosities, unusual in some single respect, normal—and often subnormal—in most others. You see that, Randu?"

"I do. But what of the Mule?"

"Supposing the Mule to be a mutant then, we can assume that he has some attribute, undoubtedly mental, which can be used to conquer worlds. In other respects, he undoubtedly has his shortcomings, which we must locate. He would not be so secretive, so shy of other's eyes, if these shortcomings were not apparent and fatal. *If* he's a mutant."

"Is there an alternative?"

"There might be. Evidence for mutation rests on Captain Han Pritchett of what used to be Foundation's Intelligence. He drew his conclusions from the feeble memories of those who claimed to know the Mule—or somebody who might have been the Mule—in infancy and early childhood. Pritchett worked on slim pickings there, and what evidence he found might easily have been planted by the Mule for his own purposes, for it's certain that the Mule has been vastly aided by his reputation as a mutant-superman."

"This is interesting. How long have you thought that?"

"I never thought that, in the

sense of believing it. It is merely an alternative to be considered. For instance, Randu, suppose the Mule has discovered a form of radiation capable of depressing mental energy just as he is in possession of one which depresses atomic reactions. What then, eh? Could that explain what's hitting us now—and what did hit the Foundation?"

Randu seemed immersed in a near-wordless gloom.

He said, "What of your own researches on the Mule's clown?"

And now Ebling Mis hesitated, "Useless as yet. I spoke bravely to the mayor previous to the Foundation's collapse, mainly to keep his courage up—partly to keep my own up as well. But, Randu, if my mathematical tools were up to it, then from the clown alone I could analyze the Mule completely. Then we would have him. Then we could solve the queer anomalies that have impressed me already."

"Such as?"

"Think, man. The Mule defeated the navies of the Foundation at will, but he has not once managed to force the much weaker fleets of the Independent Traders to retreat in open combat. The Foundation fell at a blow; the Independent Traders hold out against all his strength. He first used his Extinguishing Field upon the atomic weapons of the Independent Traders of Mnemon. The element of surprise lost them that battle but they countered the Field. He was never able to use it successfully against the Independents again.

"But over and over again, it worked against Foundation forces. It worked on the Foundation itself. Why? With our present knowledge, it is all illogical. So there must be factors of which we are not aware."

"Treachery?"

"That's rattle-pated nonsense, Randu. Unprintable twaddle. There wasn't a man on the Foundation who wasn't sure of victory. Who would betray a certain-to-win side."

Randu stepped to the curved window and stared unseeing out into the unseeable. He said, "But we're certain to lose now, if the Mule had a thousand weaknesses; if he were a network of holes—"

He did not turn. It was as if the slump of his back, the nervous groping for one another of the hands behind him that spoke. He said, "We escaped easily after the Time Vault episode, Ebling. Others might have escaped as well. A few did. Most did not. The Extinguishing Field could have been counteracted. It asked ingenuity and a certain amount of labor. All the ships of the Foundation Navy could have flown to Haven or other nearby planets to continue the fight as we did. Not one percent did so. In effect, they deserted to the enemy.

"The Foundation underground, upon which most people here seem to rely so heavily, has thus far done nothing of consequence. The Mule has been politic enough to promise to safeguard the property and profits of the great Traders and

they have gone over to him."

Ebling Mis said stubbornly, "The plutocrats have always been against us."

"They always held the power, too. Listen, Ebling. We have reason to believe that the Mule or his tools have already been in contact with powerful men among the Independent Traders. At least ten of the twenty-six Trading Worlds are known to have gone over to the Mule. Perhaps ten more waver. There are personalities on Haven itself who would not be unhappy over the Mule's domination. It's apparently an insurmountable temptation to give up endangered political power, if that will maintain your hold over economic affairs."

"You don't think Haven can fight the Mule?"

"I don't think Haven will." And now Randu turned his troubled face full upon the psychologist. "I think Haven is waiting to surrender. It's what I called you here to tell you. I want you to leave Haven."

Ebling Mis puffed up his plump cheeks in amazement. "Already?"

Randu felt horribly tired, "Ebling, you are the Foundation's greatest psychologist. The real master-psychologists went out with Seldon, but you're the best we have. You're our only chance of defeating the Mule. You can't do that here; you'll have to go to what's left of the Empire?"

"To Tranto?"

"That's right. What was once the Empire is bare bones today, but something must still beat at the center. They've got the records

there, Ebling. You may learn more of mathematical psychology; perhaps enough to be able to interpret the clown's mind. He will go with you, of course."

Mis responded dryly, "I doubt if he'd be willing to, even for fear of the Mule, unless your niece went with him."

"I know that. Toran and Bayta are leaving with you for that very reason. And, Ebling, there's another, greater purpose. Hari Seldon founded *two* Foundations three centuries ago; one at each end of the Galaxy. *You must find that Second Foundation!*"

X.

The mayor's palace—what was once the mayor's palace—was a looming smudge in the darkness. The city was quiet under its conquest and curfew, and the hazy milk of the great Galactic Lens, with here and there a lonely star, dominated the sky of the Foundation.

In three centuries the Foundation had grown from a private project of a small group of scientists to a tentacular trade empire sprawling deep into the Galaxy and half a year had flung it from its heights to the status of another conquered province.

Captain Han Pritchler refused to grasp that.

The city's sullen nighttime quiet, the darkened palace, intruder-occupied, were symbolic enough, but Captain Han Pritchler, just within the outer gate of the palace, with the tiny atomic bomb under

his tongue, refused to understand.

A shape drifted closer—the captain bent his head.

The whisper came deathly low, "The alarm system is as it always was, captain. Proceed! It will register nothing."

Softly, the captain ducked through the low archway, and down the fountain-lined path to what had been Indbur's garden.

Four months ago had been the day in the Time Vault, the fullness of which his memory balked at. Singly and separately, the impressions would come back, unwelcome, mostly at night.

Old Seldon speaking his benevolent words that were so shatteringly wrong—the jumbled confusion—Indbur, with his mayoral costume incongruously bright about his pinched, unconscious face—the frightened crowds gathering quickly, waiting noiselessly for the inevitable word of surrender—the young man, Toran, disappearing out of a side door with the Mule's clown dangling over his shoulder.

And himself, somehow out of it all afterward, with his car unworkable.

Shouldering his way along and through the leaderless mob that was already leaving the city—destination unknown.

Making blindly for the various rat holes which were—which had once been—the headquarters for a democratic underground that for eighty years had been failing and dwindling.

And the rat holes were empty.

The next day, black alien ships were momentarily visible in the sky, sinking gently into the clustered buildings of the nearby city. Captain Han Pritchett felt an accumulation of helplessness and despair drown him.

He started his travels in earnest.

In thirty days, he had covered nearly two hundred miles on foot, changed to the clothing of a worker in the hydroponic factories whose body he found newly-dead by the side of the road, grown a fierce beard of russet intensity—

And found what was left of the underground.

The city was Newton, the district a residential one of one-time elegance slowly edging towards squalor, the house an undistinguished member of a row, and the man a small-eyed, big-bones whose knotted fists bulged through his pockets and whose wiry body remained unbudgingly in the narrow door opening.

The captain mumbled, "I come from Miran."

The man returned the gambit, grimly, "Miran is early this year."

The captain said, "No earlier than last year."

But the man did not step aside. He said, "Who are you?"

"Aren't you Fox?"

"Do you always answer by asking?"

The captain took an imperceptibly longer breath, and then said calmly, "I am Han Pritchett, Captain of the Fleet, and member of the Democratic Underground Party. Will you let me in?"



The Fox stepped aside. He said, "My real name is Orum Palley."

He held out his hand. The captain took it.

The room was well-kept, but not lavish. In one corner stood a decorative book-film projector, which to the captain's military eyes, might easily have been a camouflaged blaster of respectable caliber. The projecting lens covered the doorway, and such could be remotely controlled.

The Fox followed his bearded guest's eyes, and smiled tightly. He said, "Yes! But only in the days of Indbur and his lackey-hearted vampires. It wouldn't do much against the Mule, eh? Nothing would help against the Mule. Are you hungry?"

The captain's jaw muscles tightened beneath his beard, and he nodded.

"It'll take a minute if you don't mind waiting." The Fox removed cans from a cupboard and placed two before Captain Pritchett. "Keep your finger on it, and break them when they're hot enough. My heat-control unit's out of whack. Things like that remind you there's a war on—or was on, eh?"

His quick words had a jovial content, but were said in anything but a jovial tone—and his eyes were coldly thoughtful. He sat down opposite the captain and said, "There'll be nothing but a burn-spot left where you're sitting, if there's anything about you I don't like. Know that?"

The captain did not answer. The

cans before him opened at a pressure.

The Fox said, shortly, "Stew! Sorry, but the food situation is short."

"I know," said the captain. He ate quickly; not looking up.

The Fox said, "I once saw you. I'm trying to remember, and the beard is definitely out of the picture."

"I haven't shaved in thirty days." Then, fiercely, "What do you want? I had the correct passwords. I have identification."

The other waved a hand, "Oh, I'll grant you're Pritchett all right. But there are plenty who have the passwords, and the identifications, and the *identities*—who are with the Mule. Ever hear of Levvaw, eh?"

"Yes."

"He's with the Mule."

"What? He—"

"Yes. He was the man they called 'No Surrender.'" The Fox's lips made laughing motions, with neither sound nor humor. "Then there's Willig. With the Mule! Garre and Noth. With the Mule! Why not Pritchett as well, eh? How would I know?"

The captain merely shook his head.

"But it doesn't matter," said the Fox, softly. "They must have my name, if Noth has gone over—so if you're legitimate, you're in more new danger than I am over our acquaintanceship."

The captain had finished eating. He leaned back, "If you have no

organization here, where can I find one? The Foundation may have surrendered, but I haven't."

"So! You can't wander forever, captain. Men of the Foundation must have travel permits to move from town to town these days. You know that? Also identity cards. You have one? Also, all officers of the old Navy have been requested to report to the nearest occupation headquarters. That's you, eh?"

"Yes." The captain's voice was hard. "Do you think I run through fear. I was on Kalgan not long after *its* fall to the Mule. Within a month, not one of the old warlord's officers was at large, because they were the natural military leaders of any revolt. It's always been the underground's knowledge that no revolution can be successful without the control of at least part of the Navy. The Mule evidently knows it, too."

The Fox nodded thoughtfully, "Logical enough. The Mule is thorough."

"I discarded the uniform as soon as I could. I grew the beard. Afterwards there may be a chance that others have taken the same action."

"Are you married?"

"My wife is dead. I have no children."

"You're hostage-immune, then."

"Yes."

"You want my advice?"

"If you have any."

"I don't know what the Mule's policy is or what he intends, but skilled workers have not been harmed so far. Pay rates have gone

up. Production of all sorts of atomic weapons is booming."

"Yes? Sounds like a continuing offensive."

"I don't know. The Mule's a subtle son of a drab, and he may merely be soothing the workers into submission. If Seldon couldn't figure him out with all his psycho-history, I'm not going to try. But you're wearing work clothes. That suggests something, eh?"

"I'm not a skilled worker."

"You've had a military course in atomics, haven't you?"

"Certainly."

"That's enough. The Atom-Field Bearings, Inc. is located here in town. Tell them you've had experience. The stinkers who used to run the factory for Indbur are still running it—for the Mule. They won't ask questions, as long as they need more workers to make their fat hunk. They'll give you an identity card and you can apply for a room in the Corporation's housing district. You might start now."

In that manner, Captain Hann Pritch of the National Fleet became Shield-man Lo Moro of the 45 Shop of Atom-Field Bearings, Inc. And from an Intelligence agent, he descended the social scale to "conspirator"—a calling which led him months later to what had been Indbur's private garden.

In the garden, Captain Pritch consulted the radometer in the palm of his hand. The inner warning field was still in operation, and he waited. Half an hour remained to the life of the atomic bomb in his

mouth. He rolled it gingerly with his tongue.

The radometer died into an ominous darkness and the captain advanced quickly.

So far, matters had progressed well.

He reflected objectively that the life of the atomic bomb was his as well; that its death was his death—and the Mule's death.

And the grand climacteric of a four-month's private war would be reached; a war that had passed from flight through a Newton factory—

For two months, Captain Pritch wore leaden aprons and heavy face shields, till all things military had been frictioned off his outer bearing. He was a laborer, who collected his pay, spent his evenings in town, and never discussed politics.

For two months, he did not see the Fox.

And then, one day, a man stumbled past his bench, and there was a scrap of paper in his pocket. The word "Fox" was on it. He tossed it into the atom chamber where it vanished in a sightless puff, sending the energy output up a millimicrovolt—and turned back to his work.

That night he was at the Fox's home, and took a hand in a game of cards with two other men he knew by reputation and one by name and face.

Over the cards and the passing and repassing tokens, they spoke.

The captain said, "It's a fundamental error. You live in the

exploded past. For eighty years, our organization has been waiting for the correct historical moment. We've been blinded by Seldon's psychohistory, one of the first propositions of which is that the individual does not count, does not make history, and that complex social and economic factors override him, make a puppet out of him." He adjusted his cards carefully, appraised their value and said, as he put out a token, "Why not kill the Mule?"

"Well, now, and what good would that do?" demanded the man at his left, fiercely.

"You see," said the captain, discarding two cards, "that's the attitude. What is one man out of trillions. The Galaxy won't stop rotating because one man dies. But the Mule is not a man, he is a Mutant. Already, he had upset Seldon's plan, and if you'll stop to analyze the implications, it means that he—one man—one mutant—upset all of Seldon's psychohistory. If he had never lived, the Foundation would not have fallen. If he ceased living, it would not remain fallen.

"Come, the democrats have fought the mayors and the traders for eighty years by connivery. Let's try assassination."

"How?" interposed the Fox, with cold common sense.

The captain said, slowly, "I've spent three months of thought on that with no solution. I came here and had it in five minutes." He glanced briefly at the man whose broad, pink melon of a face smiled

from the place at his right. "You were once Mayor Indbur's chamberlain. I did not know you were of the underground."

"Nor I, that you were."

"Well, then, in your capacity as chamberlain, you periodically checked the working of the alarm system of the palace."

"I did."

"And the Mule occupies the palace now."

"So it has been announced—though he is a modest conqueror who makes no speeches, proclamations nor public appearances of any sort."

"That's an old story, and affects nothing. You, my ex-chamberlain, are all we need."

The cards were shown and the Fox collected the stakes. Slowly, he dealt a new hand.

The man who had once been chamberlain picked up his cards, singly. "Sorry, captain. I checked the alarm system, but it was routine. I know nothing about it."

"I expected that, but your mind carries an eidetic memory of the controls if it can be probed deeply enough—with a psychic probe."

The chamberlain's ruddy face paled suddenly and sagged. The cards in his hand crumpled under sudden fist-pressure, "A psychic probe?"

"You needn't worry," said the captain, sharply. "I know how to use one. It will not harm you past a few days' weakness. And if it did, it is the chance you take and the price you pay. There are some among us, no doubt, who from the

controls of the alarm could determine the wave-length combinations. There are some among us who could manufacture a small bomb under time-control and I myself will carry it to the Mule."

The men gathered over the table.

The captain continued, "On a given evening, a riot will start in Terminus City in the neighborhood of the palace. No real fighting. Disturbance—then flight. As long as the palace guard is attracted . . . or, at the very least, distracted—"

From that day for a month the preparations went on, and Captain Han Pritchier of the National Fleet having become conspirator, descended further in the social scale and became an "assassin."

Captain Pritchier, assassin, was in the palace itself, and found himself grimly pleased with his psychology. A thorough alarm system outside meant few guards within. In this case, it meant none at all.

The floor plan was clear in his mind. He was a blob moving noiselessly up the well-carpeted ramp. At its head, he flattened against the wall and waited.

The small closed door of a private room was before him. Behind that door must be the mutant who had beaten the unbeatable. He was early—the bomb had ten minutes of life in it.

Five of these passed, and still in all the world there was no sound. The Mule had five minutes to live—So had Captain Pritchier—

He stepped forward on sudden impulse. The plot could no longer

fail. When the bomb went, the palace would go with it—all the palace. A door between—ten yards between—was nothing. But he wanted to see the Mule as they died together.

In a last, insolent gesture, he thundered upon the door—

And it opened and let out the blinding light.

Captain Pritchier staggered, then caught himself. The solemn man, standing in the center of the small room before a suspended fish bowl, looked up mildly.

His uniform was a somber black, and as he tapped the bowl in an absent gesture, it bobbed quickly and the feather-finned orange and vermillion fish within, darted wildly.

He said, "Come in, captain!"

To the captain's quivering tongue, the little metal globe beneath was swelling ominously—a physical impossibility, the captain knew. But it was in its last minute of life.

The uniformed man said, "You had better spit out the foolish pellet and free yourself for speech. It won't blast."

The minute passed and with a slow, sodden motion the captain bent his head and dropped the silvery globe into his palm. With a furious force it was flung against the wall. It rebounded with a tiny, sharp clangor, gleaming harmlessly as it flew.

The uniformed man shrugged. "So much for that, then. It would have done you no good in any case, captain. I am not the Mule. You will have to be satisfied with his viceroy."

"How did you know?" muttered the captain, thickly.

"Blame it on an efficient counter-espionage system. I can name every member of your little gang, every step of their planning—"

"And you let it go this far?"

"Why not? It has been one of my great purposes here to find you and some others. Particularly you. I might have had you some months ago, while you were still a worker at the Newton Bearings Works, but this is much better. If you hadn't suggested the main outlines of the plot yourself, one of my own men would have advanced something of much the same sort for you. The result is quite dramatic, and rather grimly humorous."

The captain's eyes were hard, "I find it so, too. Is it all over now?"

"Just begun. Come, captain sit down. Let us leave heroics for the fools who are impressed by it. Captain, you are a capable man. According to the information I have, you were the first on the Foundation to recognize the power of the Mule. Since then you have interested yourself, rather daringly, in the Mule's early life. You have been one of those who carried off his clown, who, incidentally, has not yet been found, and for which there will yet be full payment. Naturally, your ability is recognized, and the Mule is not of those who fears the ability of his enemies as long as he can convert it into the ability of a new friend."

"Is that what you're hedging up to? Oh, no!"

"Oh, yes! It was the purpose of

tonight's comedy. You are an intelligent man, yet your little conspiracies against the Mule fail humorously. You can scarcely dignify it with the name of conspiracy. Is it part of your military training to waste ships in hopeless actions?"

"One must first admit them to be hopeless."

"One will," the viceroy assured him, gently. "The Mule has conquered the Foundation. It is rapidly being turned into an arsenal for accomplishment of his greater aims."

"What greater aims?"

"The conquest of the entire Galaxy. The reunion of all the torn worlds into a new Empire. The fulfillment, you dull-witted patriot, of your own Seldon's dream seven hundred years before he hoped to see it. And in the fulfillment, you can help us."

"I can, undoubtedly. But I won't, undoubtedly."

"I understand," reasoned the viceroy, "that only three of the Independent Trading Worlds yet resist. They will not last much longer. It will be the last of all Foundation forces. You still hold out."

"Yes."

"Yet you won't. A voluntary recruit is the most efficient. But the other kind will do. Unfortunately, the Mule is absent. He leads the fight, as always, against the resisting Traders. But he is in continual contact with us. You will not have to wait long."

"For what?"

"For your conversion."

"The Mule," said the captain, frigidly, "will find that beyond his ability."

"But he won't. I was not beyond it. You don't recognize me? Come, you were on Kalgan, so you have seen me. I wore a monocle, a fur-lined scarlet robe, a high-crowned hat—"

The captain stiffened in dismay. "You were the warlord of Kalgan."

"Yes. And now I am the loyal viceroy of the Mule. You see, he is persuasive."

XI.

The blockade was run successfully. In the vast volume of space, not all the navies ever in existence could keep their watch in tight proximity. Given a single ship, a skillful pilot, and a moderate degree of luck, and there are holes and to spare.

With cold-eyed calm, Toran drove a protesting vessel from the vicinity of one star to that of another. If the neighborhood of great mass made an interstellar jump erratic and difficult, it also made the enemy detection devices useless or nearly so.

And once the girdle of ships had been passed the inner sphere of dead space, through whose blockaded sub-ether no message could be driven, was passed as well. For the first time in over three months Toran felt unisolated.

A week passed before the enemy news programs dealt with anything

more than the dull, self-laudatory details of growing control over the Foundation. It was a week in which Toran's armored trading ship fleeted in from the Periphery with hasty jumps.

Ebling Mis called out to the pilot room and Toran rose blink-eyed from his charts.

"What's the matter?" Toran stepped down into the small central chamber which Bayta had inevitably devised into a living room.

Mis shook his head, "Bescuppered if I know. The Mule's newsmen are announcing a special bulletin. Thought you might want to get in on it."

"Might as well. Where's Bayta?"

"Setting the table in the diner and picking out a menu—or some such frippery."

Toran sat down upon the cot that served as Magnifico's bed, and waited. The propaganda routine of the Mule's "special bulletins" were monotonously similar. First the martial music, and then the buttery slickness of the announcer. The minor news items would come, following one another in patient lock step. Then the pause. Then the trumpets and the rising excitement and the climax.

Toran endured it. Mis muttered to himself.

The newscaster spilled out, in conventional war - correspondent phraseology, the unctuous words that translated into sound the molten metal and blasted flesh of a battle in space.

"Rapid cruiser squadrons under

Lieutenant General Sammin hit back hard today at the task force striking out from Iss—" The carefully expressionless face of the speaker upon the screen faded into the blackness of a space cut through by the quick swaths of ships reeling across emptiness in deadly battle. The voice continued through the soundless thunder—

"The most striking action of the battle was the subsidiary combat of the heavy cruiser *Cluster* against three enemy ships of the 'Nova' class—"

The screen's view veered and closed in. A great ship sparked and one of the frantic attackers glowed angrily, twisted out of focus, swung back and rammed. The *Cluster* bowed wildly and survived the glancing blow that drove the attacker off in twisting reflection.

The newsman's smooth unimpasioned delivery continued to the last blow and the last hulk.

Then a pause, and a largely similar voice-and-picture of the fight off Mnemon, to which the novelty was added of a lengthy description of a hit-and-run landing—the picture of a blasted city—huddled and weary prisoners—and off again.

Mnemon had not long to live.

The pause again—and this time the raucous sound of the expected brasses. The screen faded into the long, impressively soldier-lined corridor up which the government spokesman in councilor's uniform strode quickly.

The silence was oppressive.

The voice that came at last was solemn, slow and hard:

"By order of our sovereign, it is announced that the planet, Haven, hitherto in warlike opposition to his will, has submitted to the acceptance of defeat. At this moment, the forces of our sovereign are occupying the planet. Opposition was scattered, unco-ordinated, and speedily crushed."

The scene faded out, the original newsman returned to state importantly that other developments would be transmitted as they occurred.

Then there was dance music, and Ebling Mis threw the shield that cut the power.

Toran rose and walked unsteadily away, without a word. The psychologist made no move to stop him.

When Bayta stepped out of the kitchen, Mis motioned silence.

He said "They've taken Haven."

And Bayta said, "Already?" Her eyes were round, and sick with disbelief.

"Without a fight. Without an unprin—" He stopped and swallowed. "You'd better leave Toran alone. It's not pleasant for him. Suppose we eat without him this once."

Bayta looked once toward the pilot room, then turned hopelessly, "Very well!"

Magnifico sat unnoticed at the table. He neither spoke nor ate but stared ahead with a concentrated fear that seemed to drain all the vitality out of his thread of a body.

Ebling Mis pushed absently at his iced-fruit dessert and said, harshly, "Two Trading worlds fight. They fight, and bleed, and die and don't surrender. Only at Haven— Just as at the Foundation—"

"But why? Why?"

The psychologist shook his head. "It's of a piece with all the problem. Every queer facet is a hint at the nature of the Mule. First, the problem of how he could conquer the Foundation, with little blood, and at a single blow essentially—while the Independent Trading Worlds held out. The blanket on atomic reactions was a puny weapon—we've discussed that back and forth till I'm sick of it—and it did not work on any but the Foundation.

"Randu suggested," and Ebling's grizzly eyebrows pulled together, "it might have been a radiant Will-Depresser. It's what might have done the work on Haven. But then why wasn't it used on Mnemon and Iss—which even now fight with such demonic intensity that it is taking half the Foundation fleet in addition to the Mule's forces to beat them down. Yes, I recognized Foundation ships in the attack."

Bayta whispered, "The Foundation, then Haven. Disaster seems to follow us, without touching. We always seem to get out by a hair. Will it last forever?"

Ebling Mis was not listening. To himself, he was making a point, "But there's another problem—another problem. Bayta, you remember the news item that the Mule's

clown was not found on Terminus; that it was suspected he had fled to Haven, or been carried there by his original kidnapers. There is an importance attached to him, Bayta, that doesn't fade; and we have not located it yet. Magnifico must know something that is fatal to the Mule. I'm sure of it."

Magnifico, white and stuttering, protested, "Sire . . . noble lord . . . indeed, I swear it is past my poor reckoning to penetrate your wants. I have told what I know to the utter limits, and with your probe, you have drawn out of my meager wit that which I knew, but knew not that I knew."

"I know . . . I know. It is something small. A hint so small, that neither you nor I recognize it for what it is. Yet I must find it—for Mnemon and Iss will go soon, and when they do, we are the last remnants, the last droplets of the independent Foundation."

The stars begin to cluster closely when the core of the Galaxy is penetrated. Gravitational fields begin to overlap at intensities sufficient to introduce perturbations in an interstellar jump that cannot be overlooked.

Toran became aware of that when a jump landed their ship in the full glare of a red giant which clutched viciously, and whose grip was loosed, then wrenched apart, only after twelve sleepless, soul-battering hours.

With charts limited in scope, and an experience not at all fully developed, either operationally or mathe-

matically, Toran resigned himself to days of careful plotting between jumps.

It became a community project of a sort. Ebling Mis checked Toran's mathematics and Bayta tested possible routes, by the various generalized methods, for the presence of real solutions. Even Magnifico was put to work on the calculating machine for routine computations, a type of work, which, once explained, was a source of great amusement to him and at which he was surprisingly proficient.

So at the end of a month, or nearly, Bayta was able to survey the red line that wormed its way through the ship's trimensional model of the Galactic Lens halfway to its center, and say with satiric relish, "You know what it looks like. It looks like a ten-foot earthworm with a terrific case of indigestion. Eventually, you'll land us back in Haven."

"I will," growled Toran, with a fierce rustle of his chart, "if you don't shut up."

"And at that," continued Bayta, "there is probably a route right through, straight as a meridian of longitude."

"Yeah? Well, in the first place, dimwit, it probably took five hundred ships five hundred years to work out that route by hit-and-miss, and my lousy half-credit charts don't give it. Besides, maybe those straight routes are a good thing to avoid. They're probably choked up with ships. And besides—"

"Oh, for Galaxy's sake, stop

drivelng and slavering so much righteous indignation." Her hands were in his hair.

He yowled, "Ouch! Let go!" seized her wrists and whipped downward, whereupon Toran, Bayta, and chair formed a tangled, threesome on the floor. It degenerated into a panting wrestling match, composed mostly of choking laughter and various foul blows.

Toran broke loose at Magnifico's breathless entrance.

"What is it?"

The lines of anxiety puckered the clown's face and tightened the skin whitely over the enormous bridge of his nose. "The instruments are behaving queerly, sir. I have not, in the knowledge of my ignorance, touched anything—"

In two seconds, Toran was in the pilot room. He said quietly to Magnifico, "Wake up Ebling Mis. Have him come down here."

He said to Bayta, who was trying to get a basic order back to her hair by use of her fingers, "We've been detected, Bay."

"Detected?" And Bayta's arms dropped. "By whom?"

"Galaxy knows," muttered Toran, "but I imagine by someone with blasters already ranged and trained."

He sat down, and in a low voice, was already sending into the subether the ship's identification code.

And when Ebling Mis entered, bath-robed and blear-eyed, Toran said with a desperate calm, "It seems we're inside the borders of a local Inner Kingdom which is called the Autarchy of Filia."

"Never heard of it," said Mis, abruptly.

"Well, neither did I," replied Toran, "but we're being stopped by a Filian ship just the same, and I don't know what it will involve."

The captain-inspector of the Filian ship crowded aboard with six armed men following him. He was short, thin-haired, thin-lipped, and dry-skinned. He coughed a sharp cough as he sat down and threw open the folio under his arm to a blank page.

"Your passports and ship's clearance, please."

"We have none," said Toran.

"None, hey?" he snatched up a microphone suspended from his belt and spoke into it quickly, "Three men and one woman. Papers not in order." He made an accompanying notation in the folio.

He said, "Where are you from?"

"Siwenna," said Toran warily.

"Where is that?"

"A hundred thousand parsecs, eighty degrees west Trantor, forty degrees—"

"Never mind, never mind!" Toran could see that his inquisitor had written down: "Point of origin—Periphery."

The Filian continued. "Where are you going?"

Toran said, "Trantor sector."

"Purpose?"

"Pleasure trip."

"Carrying any cargo?"

"No."

"Hm-m-m. We'll check on that." He nodded and two men jumped

to activity. Toran made no move to interfere.

"What brings you into Filian territory?" The Filian's eyes gleamed unamiably.

"We didn't know we were. I lack a proper chart."

"You will be required to pay a hundred credit for that lack—and, of course, the usual fees required for tariff duties, et cetera."

He spoke again into the microphone—but listened more than he spoke. Then, to Toran, "Know anything about atomic technology?"

"A little," replied Toran, guardedly.

"Yes?" the Filian closed his folio, and added. "The men of the Periphery have a knowledgeable reputation that way. Put on a suit and come with me."

Bayta stepped forward. "What are you going to do with him?"

Toran put her aside gently, and asked coldly, "Where do you want me to come?"

"Our power plant needs minor adjustments. He'll come with you." His pointing finger aimed directly at Magnifico, whose brown eyes opened wide in a blubbery dismay.

"What's he got to do with it?" demanded Toran fiercely.

The official looked up coldly. "I am informed of pirate activities in this vicinity. A description of one of the known thugs tallies roughly. It is a purely routine matter of identification."

Toran hesitated, but six men and six blasters are eloquent arguments. He reached into the cupboard for the suits.

An hour later, he rose upright in the bowels of the Filian ship and raged, "There's not a thing wrong with the motors that I can see. The busbars are true, the L-tubes are feeding properly and the reaction analysis checks. Who's in charge here?"

The head engineer said quietly, "I am."

"Well, get me out of here—"

He was led to the officers' level and the small anteroom held only an indifferent ensign.

"Where's the man who came with me?"

"Please wait," said the ensign.

It was fifteen minutes later that Magnifico was brought in.

"What did they do to you?" asked Toran quickly.

"Nothing. Nothing at all." Magnifico's head shook a slow, negative.

It took two hundred and fifty credits to fulfill the demands of Fili—fifty credits of it for instant release—and they were in free space again.

Bayta said with a forced laugh. "Don't we rate an escort? Don't we get the usual figurative boot over the border?"

And Toran replied, grimly, "That was no Filian ship—and we're not leaving for awhile. Come in here."

They gathered about him.

He said, whitely, "That was a Foundation ship, and those were the Mule's men aboard."

Ebling bent to pick up the cigar he had dropped. He said, "Here?"

We're thirty thousand parsecs from the Foundation."

"And *we're* here. What's to prevent them from making the same trip. Galaxy, Ebling, don't you think I can tell ships apart. I saw their engines, and that's enough for me. I tell you it was a Foundation engine in a Foundation ship."

"And how did they get here?" asked Bayta, logically. "What are the chances of a random meeting of two given ships in space?"

"What's that to do with it?" demanded Toran, hotly. "It would only show we've been followed."

"Followed?" hooted Bayta. "Through hyperspace?"

Ebling Mis interposed wearily, "That can be done—given a good ship and a great pilot. But the possibility doesn't impress me."

"I haven't been masking my trail," insisted Toran. "I've been building up take-off speed on the straight. A blind man could have calculated our route."

"The blazes he could," cried Bayta. "With the cockeyed jumps you were making, observing our initial direction didn't mean a thing. We came out of the jump wrong-end forwards more than once."

"We're wasting time," blazed Toran, with gritted teeth. "It's a Foundation ship under the Mule. It's stopped us. It's searched us. It's had Magnifico—alone—with me as hostage to keep the rest of you quiet, in case you suspected. And we're going to burn it out of space right now."

"Hold on, now," and Ebling Mis clutched at him. "Are you going

to destroy us for one ship you think is an enemy. Think, man, would those scuppers chase us over an impossible route half through the bestinkered Galaxy, look us over, and then *let us go?*"

"They're still interested in where we're going."

"Then why stop us and put us on our guard? You can't have it both ways, you know."

"I'll have it my way. Let go of me, Ebling, or I'll knock you down."

Magnifico leaned forward from his balanced perch on his favorite chair back. His long nostrils flared with excitement. "I crave your pardon for my interruption, but my poor mind is of a sudden plagued with a queer thought."

Bayta anticipated Toran's gesture of annoyance, and added her grip to Ebling's. "Go ahead and speak, Magnifico. We will all listen faithfully."

Magnifico said, "In my stay in their ship what addled wits I have were bemazed and bemused by a chattering fear that befell me. Of a truth I have a lack of memory of most that happened. Many men staring at me, and talk I did not understand. But towards the last—as though a beam of sunlight had dashed through a cloud rift—there was a face I knew. A glimpse, the merest glimmer—and yet it glows in my memory ever stronger and brighter."

Toran said, "Who was it?"

"That captain who was with us so long a time ago, when first you saved me from slavery."

It had obviously been Magnifico's

intention to create a sensation, and the delighted smile that curled broadly in the shadow of his proboscis, attested to his realization of the intention's success.

"Captain . . . Han . . . Pritch?" demanded Mis, sternly. "You're sure of that? Certain sure now?"

"Sir, I swear," and he laid a bone-thin hand upon his narrow chest. "I would uphold the truth of it before the Mule and swear it in his teeth, though all his power were behind him to deny it."

Bayta said in pure wonder, "Then what's it all about?"

The clown faced her eagerly, "My lady, I have a theory. It came upon me, ready made, as though the Galactic Spirit had gently laid it in my mind." He actually raised his voice above Toran's interrupting objection.

"My lady," he addressed himself exclusively to Bayta, "if this captain had, like us, escaped with a ship; if he, like us, were on a trip for a purpose of his own devising; if he blundered upon us—he would suspect us of following and waylaying him, as *we* suspect *him* of the like. What wonder he played this comedy to enter our ship."

"Why would he want us in *his* ship, then?" demanded Toran. "That doesn't fit."

"Why, yes, it does," clamored the clown, with a flowing inspiration. "He sent an underling who knew us not, but who described us into his microphone. The listening captain would be struck at my own poor likeness—for, of a truth there are not many in this great Galaxy

who bear a resemblance to my scantiness. I was the proof of the identity of the rest of you."

"And so he leaves us?"

"What do we know of this mission, and the secrecy thereof. He has spied us out for not an enemy and having it done so, must he needs think it wise to risk his plan by widening the knowledge thereof."

Bayta said slowly, "Don't be stubborn, Torie. It *does* explain things."

"It could be," agreed Mis.

Toran seemed helpless in the face of united resistance. Something in the clown's fluent explanations bothered him. Something was wrong. Yet he was bewildered and, in spite of himself, his anger ebbed.

"For a while," he whispered, "I thought we might have had *one* of the Mule's ships."

And his eyes were dark with the pain of Haven's loss.

The others understood.

XII.

Neotrantor was the name! New Trantor! And when you have said the name you have exhausted at a stroke all the resemblances of the new Trantor to the great original. Two parsecs away, the sun of Old Trantor still shone and the Galaxy's Imperial Capital of the previous century still cut through space in the silent and eternal repetition of its orbit.

Men even inhabited Old Trantor. Not many—a hundred million, perhaps, where fifty years before, forty

billions had swarmed. The huge, metal world was in jagged splinters. The towering thrusts of the multi-towers from the single world-girdling base were torn and empty—still bearing the original blast-holes and firegut-shards of the Great Sack of forty years earlier.

It was strange that a world which had been the center of a Galaxy for two thousand years—that had ruled limitless space and been home to legislators and rulers whose whims spanned the parsecs—could die in a month. It was strange that a world which had been untouched through the vast conquering sweeps and retreats of a millennium, and equally untouched by the civil wars and palace revolutions of another millennium—should lie dead at last. It was strange that the Glory of the Galaxy should be a rotting corpse.

And pathetic!

For centuries would yet pass before the mighty works of fifty generations of humans would decay past use. Only the declining powers of men, themselves, rendered them useless now.

The millions left after the billions had died tore up the gleaming metal base of the planet and exposed soil that had not felt the touch of sun in a thousand years.

Surrounded by the mechanical perfections of human efforts, encircled by the industrial marvels of mankind freed of the tyranny of environment—they returned to the land. In the huge traffic clearings, wheat and corn grew. In the shadow of the towers, sheep grazed.

But Neotrantor existed—an obscure village of a planet drowned in the shadow of mighty Trantor, until a heart-throttled royal family, racing before the fire and flame of the Great Sack sped to it as its last refuge—and held out there, barely, until the roaring wave of rebellion subsided. There it ruled in ghostly splendor over a cadaverous remnant of Imperium.

Twenty agricultural worlds were a Galactic Empire!

Dagobert IX, ruler of twenty worlds of refractory squires and sullen peasants, was Emperor of the Galaxy, Lord of the Universe.

Dagobert IX had been twenty-five on the bloody day he arrived with his father upon Neotrantor. His eyes and mind were still alive with the glory and the power of the Empire that was. But his son, who might one day be Dagobert X, was born on Neotrantor.

Twenty worlds were all he knew.

Jord Commason's open air car was the finest vehicle of its type on all Neotrantor—and, after all, justly so. It did not end with the fact that Commason was the largest landowner on Neotrantor. It began there. For in earlier days he had been the companion and evil genius of a young crown prince, restive in the dominating grip of a middle-aged emperor. And now he was the companion and still the evil genius of a middle-aged crown prince who hated and dominated an old emperor.

So Jord Commason, in his air car, which in mother-of-pearl finish

and gold-and-lumetron ornamentation needed no coat of arms as owner's identification, surveyed the lands that were his, and the miles of rolling wheat that were his, and the huge threshers and harvesters that were his, and the tenant-farmers and machine-tenders that were his—and considered his problems cautiously.

Beside him, his bent and withered chauffeur, guided the ship gently through the upper winds, and smiled.

Jord Commason spoke to the wind, the air, and the sky, "You remember what I told you, Inchney?"

Inchney's thin gray hair wisped lightly in the wind. His gap-toothed smile widened in its thin-lipped fashion and the vertical wrinkles of his cheeks deepened as though he were keeping an eternal secret from himself. The whisper of his voice whistled between his teeth.

"I remember, sire, and I have thought."

"And what have you thought, Inchney?" There was an impatience about the question.

Inchney remembered that he had been young and handsome, and a lord on Old Trantor. Inchney remembered that he was a disfigured ancient on Neotrantor, who lived by grace of Squire Jord Commason, and paid for that grace by lending his subtlety on request. He sighed very softly.

He whispered again, "Visitors from the Foundation, sire, are a convenient thing to have. Especial-



ly, sire, when they come with but a single ship, and but a single fighting man. How welcome they might be?"

"Welcome?" said Commason, gloomily. "Perhaps so. But those men are magicians and may be powerful."

"*Pugh*," muttered Inchney, "the mistiness of distance hides the truth. The Foundation is but a world. Its citizens are but men. If you blast them, they die."

Inchney held the ship on its course. A river was a winding sparkle below. He whispered, "And is there not a man they speak of now who stirs the worlds of the Periphery?"

Commason was suddenly suspicious, "What do you know of this?"

There was no smile on his chauf-

feur's face, "Nothing, sire. It was but an idle question."

The squire's hesitation was short. He said, with brutal directness, "Nothing you ask is idle, and your method of acquiring knowledge will have your scrawny neck in a vise yet. But—have it! This man is called the Mule, and a subject of his had been here some months ago on a . . . matter of business. I await another . . . now . . . for its conclusion."

"And these newcomers? They are not the ones you want, perhaps?"

"They lack the identification they should have."

"It has been reported that the Foundation has been captured—"

"I did not tell you that."

"It has been so reported," continued Inchney, coolly, "and if that

is correct, then these may be refugees from the destruction, and may be held for the Mule's man out of honest friendship."

"Yes?" Commason was uncertain.

"And, sire, since it is well-known that the friend of a conqueror is but the last victim, it would be but a measure of honest self-defense. For there are such things as psychic probes, and here we have four Foundation brains. There is much about the Foundation it would be useful to know, much even about the Mule. And then the Mule's friendship would be a trifle the less overpowering."

Commason, in the quiet of the upper air, returned with a shiver to his first thought, "But if the Foundation has not fallen. If the reports are lies. It is said that it has been foretold it cannot fall."

"We are past the age of soothsayers, sire."

"And yet if it did not fall, Inchney. Think! If it did not fall. The Mule made me promises, indeed—" He had gone too far, and backtracked. "That is, he made boasts. But boasts are wind and deeds are hard."

Inchney laughed noiselessly, "Deeds are hard indeed, until begun. One could scarcely find a further fear than a Galaxy-end Foundation."

"There is still the prince," murmured Commason, almost to himself.

"He deals with the Mule also, then, sire?"

Commason could not quite choke down the complacent shift of features, "Not entirely. Not as *I* do. But he grows wilder, more uncontrollable. A demon is upon him. If I seize these people and he takes them away for his own use—for he does not lack a certain shrewdness—I am not yet ready to quarrel with him." He frowned and his heavy cheeks bent downwards with dislike.

"I saw those strangers for a few moments yesterday," said the gray chauffeur, irrelevantly, "and it is a strange woman, that dark one. She walks with the freedom of a man and she is of a startling paleness against the dark luster of hair." There was almost a warmth in the husky whisper of the withered voice, so that Commason turned toward him in sudden surprise.

Inchney continued, "The prince, I think, would not find his shrewdness proof against a reasonable compromise. You could have the rest, if you left him the girl—"

A light broke upon Commason, "A thought! Indeed a thought! Inchney, turn back! And Inchney, if all turns well, we will discuss further this matter of your freedom."

It was with an almost superstitious sense of symbolism that Commason found a Personal Capsule waiting for him in his private study when he returned. It had arrived by a wave length known to few. Commason smiled a fat smile. The Mule's man was coming and the Foundation had indeed fallen.

Bayta's misty visions, when she had them, of an Imperial palace, did not jibe with the reality, and inside her, there was a vague sense of disappointment. The room was small, almost plain, almost ordinary. The palace did not even match the mayor's residence back at the Foundation—and Dagobert IX—

Bayta had *definite* ideas of what an emperor ought to look like. He ought *not* look like somebody's benevolent grandfather. He ought not be thin and white and faded—or serving cups of tea with his own hand in an expressed anxiety for the comfort of his visitors.

But so it was.

Dagobert IX chuckled as he poured tea into her stiffly outheld cup.

"This is a great pleasure for me, my dear. It is a moment away from ceremony and courtiers. I have not had the opportunity for welcoming visitors from my outer provinces for a time now. My son takes care of these details now that I'm older. You haven't met my son? A fine boy. Headstrong, perhaps. But then he's young. Do you care for a flavor capsule? No?"

Toran attempted an interruption, "Your imperial majesty—"

"Yes?"

"Your imperial majesty, it has not been our intention to intrude upon you—"

"Nonsense, there is no intrusion. Tonight there will be the official reception, but until then, we are free. Let's see, where did you say you were from? It seems a long time since we had an official recep-

tion. You said you were from the Province of Anacreon?"

"From the Foundation, your imperial majesty!"

"Yes, the Foundation. I remember now. I had it located. It is in the Province of Anacreon. I have never been there. My doctor forbids extensive traveling. I don't recall any recent reports from my viceroy at Anacreon. How are conditions there," he concluded anxiously.

"Sire," mumbled Toran, "I bring no complaints."

"That is gratifying. I will commend my viceroy."

Toran looked helplessly at Ebling Mis, whose brusque voice rose, "Sire, we have been told that it will require your permission for us to visit the Imperial University Library on Trantor."

"Trantor?" questioned the emperor, mildly, "Trantor?"

Then a look of puzzled pain crossed his thin face. "Trantor?" he whispered. "I remember now. I am making plans now to return there with a flood of ships at my back. You shall come with me. Together we will destroy the rebel Gilmer. Together we shall restore the empire!"

His bent back had straightened. His voice had strengthened. For a moment his eyes were hard. Then, he blinked and said softly. "But Gilmer is dead. I seem to remember—Yes. Yes! Gilmer is dead! Trantor is dead— For a moment, it seemed— Where was it you said you came from?"

Magnifico whispered to Bayta.

"Is this really an emperor? For somehow I thought emperors were greater and wiser than ordinary men."

Bayta motioned him quiet. She said, "If your imperial majesty would but sign an order permitting us to go to Trantor, it would avail greatly the common cause."

"To Trantor?" The emperor was blank and uncomprehending.

"Sire, the Viceroy of Anacreon, in whose name we speak, sends word that Gilmer is yet alive—"

"Alive! Alive!" thundered Dagobert. "Where? It will be war!"

"Your imperial majesty, it must not yet be known. His whereabouts are uncertain. The viceroy sends us to acquaint you of the fact, and it is only on Trantor that we may find his hiding place. Once discovered—"

"Yes, yes— He must be found—" The old emperor doddered to the wall and touched the little photocell with a trembling finger. He muttered, after an ineffectual pause, "My servants do not come. I cannot wait for them."

He was scribbling on a blank sheet, and ended with a flourished "D." He said, "Gilmer will yet learn the power of his emperor. Where was it you came from? Anacreon? What are the conditions there? Is the name of the emperor powerful?"

Bayta took the paper from his loose fingers, "Your imperial majesty is beloved by the people. Your love for them is widely known."

"I shall have to visit my good

people of Anacreon, but my doctor says . . . I don't remember what he says, but—" He looked up, his old gray eyes sharp, "Were you saying something of Gilmer?"

"No, your imperial majesty."

"He shall not advance further. Go back and tell your people that. Trantor shall hold! My father leads the fleet now, and the rebel vermin Gilmer shall freeze in space with his regicidal rabble."

He staggered into a seat and his eyes were blank once more, "What was I saying?"

Toran rose and bowed low, "Your imperial majesty has been kind to us, but the time allotted us for an audience is over."

For a moment, Dagobert IX looked like an emperor indeed as he rose and stood stiff-backed while, one by one, his visitors retreated backward through the door—

—to where twenty armed men intervened and locked a circle about them.

A hand-weapon flashed—

To Bayta, consciousness returned sluggishly, but without the "Where am I?" sensation. She remembered clearly the odd old man who called himself emperor, and the other men who waited outside. The arthritic tingle in her finger joints meant a stun pistol.

She kept her eyes closed, and listened with painful attention to the voices.

There were two of them. One was slow and cautious, with a slyness beneath the surface obsequity. The other was hoarse and thick, al-

most sodden, and blurted out in viscous spurts. Bayta liked neither.

The thick voice was predominant.

Bayta caught the last words, "He will live forever that old madman. It wearies me. It annoys me. Commason, I will have it. I grow older, too."

"Your highness, let us first see of what use these people are.. It may be we shall have sources of strength other than your father still provides."

The thick voice was lost in a bubbling whisper. Bayta caught only the phrase,—"the girl—" but the other, fawning voice was a nasty, low, running chuckle followed by a comradely, near-patronizing, "Dagobert, you do not age. They lie who say you are not a youth of twenty."

They laughed together, and Bayta's blood was an icy trickle. Dagobert—your highness— The old emperor had spoken of a headstrong son, and the implication of the whispers now beat dully upon her. But such things didn't happen to people in real life—

Toran's voice broke upon her in a slow, hard current of cursing.

She opened her eyes, and Toran's, which were upon her, showed open relief. He said, fiercely, "This banditry will be answered by the emperor. Release us."

It dawned upon Bayta that her wrists and ankles were fastened to wall and floor by a tight attraction field.

Thick Voice approached Toran. He was paunchy, his lower eyelids puffed darkly, and his hair was

thinning—out there was a gay feather in his peaked hat, and the edging of his doublet was embroidered with silvery metal-foam.

He sneered with a heavy amusement, "The emperor? The poor, mad emperor?"

"I have his pass. No subject may hinder our freedom."

"But I am no subject, space-garbage. I am the regent and crown prince and am to be addressed as such. As for my poor silly father, it amuses him to see visitors occasionally. And we humor him. It tickles his mock-Imperial fancy. But, of course, it has no other meaning."

And then he was before Bayta, and she looked up at him contemptuously. He leaned close and his breath was overpoweringly minted.

He said, "Her eyes suit well, Commason—she is even prettier with them open. I think she'll do. It will be an exotic dish for a jaded taste, eh?"

There was a futile surge upwards on Toran's part, which the crown prince ignored and Bayta felt the iciness travel outward to the skin. Ebling Mis was still out; head lolling weakly upon his chest, but, with a sensation of surprise, Bayta noted that Magnifico's eyes were open, sharply open, as though awake for many minutes. Those large brown eyes swiveled towards Bayta and stared at her out of a doughy face.

He whimpered, and nodded with his head towards the crown prince, "That one has my Visi-Sonor."

The crown prince turned sharply

toward the new voice, "This is yours, monster?" He swung the instrument from his shoulder where it had hung, suspended by its green strap, unnoticed by Bayta.

He fingered it clumsily, tried to sound a chord and got nothing for his pains, "Can you play it, monster?"

Magnifico nodded once.

Toran said suddenly, "You've rifled a ship of the Foundation. If the emperor will not avenge, the Foundation will."

It was the other, Commason, who answered slowly, "What Foundation? Or is the Mule no longer the Mule?"

There was no answer to that. The prince's grin showed large uneven teeth. The clown's binding field was broken and he was nudged ungently to his feet. The Visi-Sonor was thrust into his hand.

"Play for us, monster," said the prince. "Play us a serenade of love and beauty for our foreign lady here. Tell her that my father's country prison is no palace, but that I can take her to one where she can swim in rose water—and know what a prince's love is. Sing of a prince's love, monster."

He placed one thick thigh upon a marble table and swung a leg idly, while his fatuous smiling stare swept Bayta into a silent rage. Toran's sinews strained against the field, in painful, perspiring effort. Ebliing Mis stirred and moaned.

Magnifico gasped, "My fingers are of useless stiffness—"

"Play, monster!" roared the

prince. The lights dimmed at a gesture to Commason, and in the dimness, he crossed his arms and waited.

Magnifico drew his fingers in rapid, rhythmic jumps from end to end of the multi-keyed instrument—and a sharp, gliding rainbow of light jumped across the room. A low, soft tone sounded—throbbing, tearful. It lifted in sad laughter, and underneath it there sounded a dull tolling.

The darkness seemed to intensify and grow thick. Music reached Bayta through the muffled folds of invisible blankets. Gleaming light reached her from the depths, as though a single candle glowed at the bottom of a pit.

Automatically, her eyes strained. The light brightened, but remained blurred. It moved fuzzily, in confused color, and the music was suddenly brassy, evil—flourishing in high crescendo. The light flickered quickly, in swift motion to the wicked rhythm. Something writhed within the light. Something with poisonous metallic scales writhed and yawned. And the music writhed and yawned with it.

Bayta struggled with a strange emotion and then caught herself in a mental gasp. Almost, it reminded her of the time in the Time Vault, of those last days on Haven. It was that horrible, cloying, clinging spiderweb of horror and despair. She shrank beneath it, oppressed.

The music dinned upon her, laughing horribly, and the writhing terror at the wrong end of the telescope in the small circle of light

was lost as she turned feverishly away. Her forehead was wet and cold.

The music died. It must have lasted fifteen minutes, and a vast pleasure at its absence flooded Bayta. Light glared, and Magnifico's face was close to hers, sweaty, wild-eyed, lugubrious.

"My lady," he gasped, "how fare you?"

"Well enough," she whispered, "but why did you play like that?"

She became aware of the others in the room. Toran and Mis were limp and helpless against the wall, but her eyes skimmed over them. There was the prince, lying strangely still at the foot of the table. There was Commason, moaning wildly through an open, drooling mouth.

Commason flinched, and yelled mindlessly, as Magnifico took a step towards him.

Magnifico turned, and with a leap, turned the others loose.

Toran lunged upwards and with eager, taut fists seized the land-owner by the neck, "You come with us. We'll want you—to make sure we get to our ship."

Two hours later, in the ship's kitchen, Bayta served a walloping homemade pie, and Magnifico celebrated the return to space by attacking it with a magnificent disregard of table manners.

"Good, Magnifico?"

"Um-m-m-m!"

"Magnifico?"

"Yes, my lady?"

"What was it you played back there?"

The clown writhed, "I . . . I'd rather not say. I learned it once, and the Visi-Sonor is of an effect upon the nervous system most profound. Surely, it was an evil thing, and not for your sweet innocence, my lady."

"Oh now, come, Magnifico. I'm not as innocent as that. Don't flatter so. Did I see anything like what *they* saw?"

"I hope not. I played it for them only. If you saw, it was but the rim of it—from afar."

"And that was enough. Do you know you knocked the prince out?"

Magnifico spoke grimly through a large, muffling piece of pie. "I killed him, my lady."

"What?" She swallowed, painfully.

"He was dead when I stopped, or I would have continued. I cared not for Commason. His greatest threat was death or torture. But, my lady, this prince looked upon you wickedly, and—" he choked in a mixture of indignation and embarrassment.

Bayta felt strange thoughts come and repressed them sternly. "Magnifico, you've got a gallant soul."

"Oh, my lady." He bent a red nose into his pie, but, somehow did not eat.

Ebling Mis stared out the port. Trantor was near—its metallic shine fearfully bright. Toran was standing there, too.

He said with dull bitterness. "We've come for nothing, Ebling.

The Mule's man precedes us."

Ebling Mis rubbed his forehead with a hand that seemed shriveled out of its former plumpness. His voice was an abstracted mutter.

Toran was annoyed. "I say those people know the Foundation has fallen. I say—"

"Eh?" Mis looked up, puzzled. Then, he placed a gentle hand upon Toran's wrist, in compete oblivion of any previous conversation, "Toran, I . . . I've been looking at Trantor. Do you know . . . I have the queerest feeling . . . ever since we arrived on Neotranstor. It's an urge, a driving urge that's pushing and pushing inside. Toran, I can do it; I know I can do it. Things are becoming clear in my mind—they have never been so clear."

Toran stared—and shrugged. The words brought him no confidence.

He said, tentatively, "Mis?"

"Yes?"

"You didn't see a ship come down on Neotranstor as we left."

Consideration was brief, "No."

"I did. Imagination, I suppose, but it could have been that Filian ship."

"The one with Captain Han Pritch on it?"

"The one with space knows who upon it. Magnifico's information— It followed us here, Mis."

Ebling Mis said nothing.

Toran said strenuously, "Is there anything wrong with you? Aren't you well?"

Mis' eyes were thoughtful,

luminous, and strange. He did not answer.

XIII.

The location of an objective upon the great world of Trantor presents a problem unique in the Galaxy. There are no continents or oceans to locate from a thousand miles distance. There are no rivers, lakes, and islands to catch sight of through the cloud rifts.

The metal-covered world was—had been—one colossal city, and only the old Imperial palace could be identified readily from outer space by a stranger. The *Bayta* circled the world at almost air-car height in repeated painful search.

From polar regions, where the icy coating of the metal spires were somber evidence of the breakdown or neglect of the weather-conditioning machinery, they worked southwards. Occasionally they could experiment with the correlations—(or presumable correlations)—between what they saw and what the inadequate map obtained at Neotranstor showed.

But it was unmistakable when it came. The gap in the metal coat of the planet was fifty miles. The unusual greenery spread over hundreds of square miles, inclosing the mighty grace of the ancient Imperial residences.

The *Bayta* hovered and slowly oriented itself. There were only the huge super-causeways to guide them. Long straight arrows on the map; smooth, gleaming ribbons there below them.

What the map indicated to be

the University area was reached by dead reckoning, and upon the flat area of what once must have been a busy landing-field, the ship lowered itself.

It was only as they submerged into the welter of metal that the smooth beauty apparent from the air dissolved into the broken, twisted near-wreckage that had been left in the wake of the Sack. Spires were truncated, smooth walls gouted and twisted, and just for an instant there was the glimpse of a shaven area of earth--perhaps several hundred acres in extent--dark and plowed.

Lee Senter waited as the ship settled downward cautiously. It was a strange ship, not from Neotrantor, and inwardly he sighed. Strange ships and confused dealings with the men of outer space could mean the end of the short days of peace, a return to the old grandiose times of death and battle. Senter was leader of the Group; the old books were in his charge and he had read of those old days. He did not want them.

Perhaps ten minutes spent themselves as the strange ship came down to nestle upon the flatness, but long memories telescoped themselves in that time. There was first the great farm of his childhood--that remained in his mind merely as busy crowds of people. Then there was the trek of the young families to new lands. He was ten, then; an only child, puzzled, and frightened.

Then the new buildings; the great metal slabs to be uprooted and torn

aside; the exposed soil to be turned, and freshened, and invigorated; neighboring buildings to be torn down and leveled; others to be transformed to living quarters.

There were crops to be grown and harvested; peaceful relations with neighboring farms to be established—

There was growth and expansion, and the quiet efficiency of self-rule. There was the coming of a new generation of hard, little youngsters born to the soil. There was the great day when he was chosen leader of the Group and for the first time since his eighteenth birthday he did not shave and saw the first stubble of his Leader's Beard appear.

And now the Galaxy might intrude and put an end to the brief idyll of isolation—

The ship landed. He watched wordlessly as the port opened. Four emerged, cautious and watchful. There were three men, varied, old, young, thin and beaked. And a woman striding among them like an equal. His hand left the two glassy black tufts of his beard as he stepped forward.

He gave the universal gesture of peace. Both hands were before him; hard, calloused palms upward.

The young man approached two steps and duplicated the gesture. "I come on peace."

The accent was strange, but the words were understandable, and welcome. He replied, deeply, "In peace be it. You are welcome to the hospitality of the Group. Are you hungry? You shall eat. Are

you thirsty? You shall drink."

Slowly, the reply came, "We thank you for your kindness, and shall bear good report of your Group when we return to our world."

A queer answer, but good. Behind him, the men of the Group were smiling, and from the recesses of the surrounding structures, the women emerged.

In his own quarters, he removed the locked, mirror-walled box from its hidden place, and offered each of the guests the long, plump cigars that were reserved for great occasions. Before the woman, he hesitated. She had taken a seat among the men. The strangers evidently allowed, even expected, such effrontery. Stiffly, he offered the box.

She accepted one with a smile, and drew in its aromatic smoke, with all the relish one could expect. Lee Senter repressed a scandalized emotion.

The stiff conversation, in advance of the meal, touched politely upon the subject of farming on Trantor.

It was the old man who asked, "What about hydroponics? Surely, for such a world as Trantor, hydroponics would be the answer."

Senter shook his head slowly. He felt uncertain. His knowledge was the unfamiliar matter of the books he had read, "Artificial farming in chemicals, I think? No, not on Trantor. This hydroponics require a world of industry—for instance, a great chemical industry. And in war or disaster, when industry breaks down, the people starve.

Nor can all foods be grown artificially. Some lose their food value. The soil is still cheaper, still better—always more dependable."

"And your food supply is sufficient?"

"Sufficient. Perhaps monotonous. We have fowl that supply eggs, and milk-yielders for our dairy products—but our meat supply rests upon our foreign trade."

"Trade." The young man seemed roused to sudden interest. "You trade then. But what do you export?"

"Metal," was the curt answer. "Look for yourself. We have an infinite supply, ready processed. They come from Neotranstor with ships, demolish an indicated area—increasing our growing space—and leave us in exchange meat, canned fruit, food concentrates, farm machinery and so on. They carry off the metal and both sides profit."

They feasted on bread and cheese, and a vegetable stew that was unreservedly delicious. It was over the dessert of frosted fruit, the only imported item on the menu, that, for the first time, the Outlanders became other than mere guests. The young man produced a map of Trantor.

Calmly, Lee Senter studied it. He listened—and said gravely, "The University Grounds are a static area. We farmers do not grow crops on it. We do not, by preference, even enter it. It is one of our few relics of another time we would keep undisturbed."

"We are seekers after knowl-

edge. We would disturb nothing. Our ship would be our hostage." The old man offered this—eagerly, feverishly.

"I can take you there then," said Senter.

That night the strangers slept, and that night Lee Senter sent a message to Neotrantor.

XIV.

The thin life of Trantor trickled to nothing when they entered among the wide-spaced buildings of the University grounds. There was a solemn and lonely silence over it.

The strangers of the Foundation knew nothing of the swirling days and nights of the bloody Sack that had left the University untouched. They knew nothing of the time after the collapse of the Imperial power, when the students, with their borrowed weapons, and their pale-faced inexperienced bravery, formed a protective volunteer army to protect the central shrine of the science of the Galaxy. They knew nothing of the Seven Days Fight, and the armistice that kept the University free, when even the Imperial palace clang'd with the boots of Gilmer and his soldiers, during the short interval of their rule.

Those of the Foundation, approaching for the first time, realized only that in a world of transition from a gutted old to a strenuous new, this area was a quiet, graceful museum-piece of ancient greatness.

They were intruders in a sense.

The brooding emptiness rejected them. The academic atmosphere seemed still to live and to stir angrily at the disturbance.

The library was a deceptively small building which broadened out vastly underground into a mammoth volume of silence and reverie. Ebling Mis paused before the elaborate murals of the reception room.

He whispered—one had to whisper here: "I think we passed the catalog rooms back a way. I'll stop there."

His forehead was flushed, his hand trembling, "I mustn't be disturbed, Toran. Will you bring my meals down to me?"

"Anything you say. We'll do all we can to help. Do you want us to work under you—"

"No. I must be alone—"

"You think you will get what you want."

And Ebling Mis replied with a soft certainty, "I know I will!"

Toran and Bayta came closer to "setting up housekeeping" in normal fashion than at any time in their year of married life. It was a strange sort of "housekeeping." They lived in the middle of grandeur with an inappropriate simplicity. Their food was drawn largely from Lee Senter's farm and was paid for in the little atomic gadgets that may be found on any Trader's ship.

Magnifico taught himself how to use the projectors in the library reading room, and sat over adventure novels and romances to the point where he was almost as for-

getful of meals and sleep as was Ebling Mis.

Ebling himself was completely buried. He had insisted on a hammock being slung up for him in the Psychology Reference Room. His face grew thin and white. His vigor of speech was lost and his favorite curses had died a mild death. There were times when the recognition of either Toran or Bayta seemed a struggle.

He was more himself with Magnifico who brought him his meals and often sat watching him for hours at a time, with a queer, fascinated absorption, as the aging psychologist transcribed endless equations, cross-referred to endless book-films, scurried endlessly about in a wild mental effort towards an end he alone saw.

Toran came upon her in the darkened room, and said sharply, "Bayta!"

Bayta started guiltily, "Yes? You want me, Torie?"

"Sure I want you. What in space are you sitting there for? You've been acting all wrong since we got to Trantor. What's the matter with you?"

"Oh, Torie, stop," she said, wearily.

And "Oh, Torie, stop!" he mimicked impatiently. Then, with sudden softness, "Won't you tell me what's wrong, Bay? Something's bothering you."

"No! Nothing is, Torie. If you keep on just nagging and nagging, you'll have me mad. I'm just-thinking."

"Thinking about what?"

"About nothing. Well, about the Mule, and Haven, and the Foundation, and everything. About Ebling Mis and whether he'll find anything about the Second Foundation, and whether it will help us when he does find it—and a million other things. Are you satisfied?" Her voice was agitated.

"If you're just brooding, do you mind stopping? It isn't pleasant and it doesn't help the situation."

Bayta got to her feet and smiled weakly, "All right. I'm happy. See, I'm smiling and jolly."

Magnifico's voice was an agitated cry outside, "My lady—"

"What is it? Come—"

Bayta's voice choked off sharply when the opening door framed the large, hard-faced—

"Pritch," cried Toran.

Bayta gasped, "Captain! How did you find us?"

Han Pritch stepped inside. His voice was clear and level, and utterly dead of feeling, "My rank is colonel now—under the Mule."

"Under the . . . Mule!" Toran's voice trailed off. They formed a tableau there, the three.

Magnifico stared wildly and shrank behind Toran. Nobody stopped to notice him.

Bayta said, her hands trembling in each other's tight grasp, "You are arresting us? You have really gone over to them?"

The colonel replied quickly, "I have not come to arrest you. My instructions make no mention of you. With regard to you, I am

(Continued on page 148)

IN TIMES TO COME

New month's issue starts off Lewis Padgett's new two-parter, "The Fairy Chessmen." It's a yarn with one of the most intriguing set-ups in a long time. It involves a war that has reached a stalemate of advanced technology—until one side shows up with a completely new technique. But the new technique is so unmanageable that, as a physical weapon, it can't be used.

But as a psychological weapon—!

The first of the technicians on the other side who tries to tackle it winds up by going mad. One of the next few shows up at the asylum, floating four feet off the ground, with the conviction that he's Mohammed, which is wrong, floating halfway between Heaven and Earth—which is right!

Normally, the attacks of one side were parried by equal advances on the part of the technologists of the other side. But this time—the technologists who might stop the new attack are being knocked over like a string of dominoes, one after the other. The department of psychology has to be called in.

At that point, the story opens. It opens, incidentally, with a doorknob, a doorknob which suddenly acquires, and opens, a large, feminine blue eye—and winks at the man who was about to open the door.

THE EDITOR.

THE ANALYTICAL LABORATORY

July, 1945

Place	Story	Author	Points
1.	Last Outpost	Ross Rocklynne	2.20
2.	The Code	Lawrence O'Donnell	2.55
3.	Lion And the Unicorn	Lewis Padgett	
4.	Tie: Disappearance	Chester S. Geier	4.00
	Tight Place	Murray Leinster	4.00
5.	Resonance	Eric F. Russell	4.57

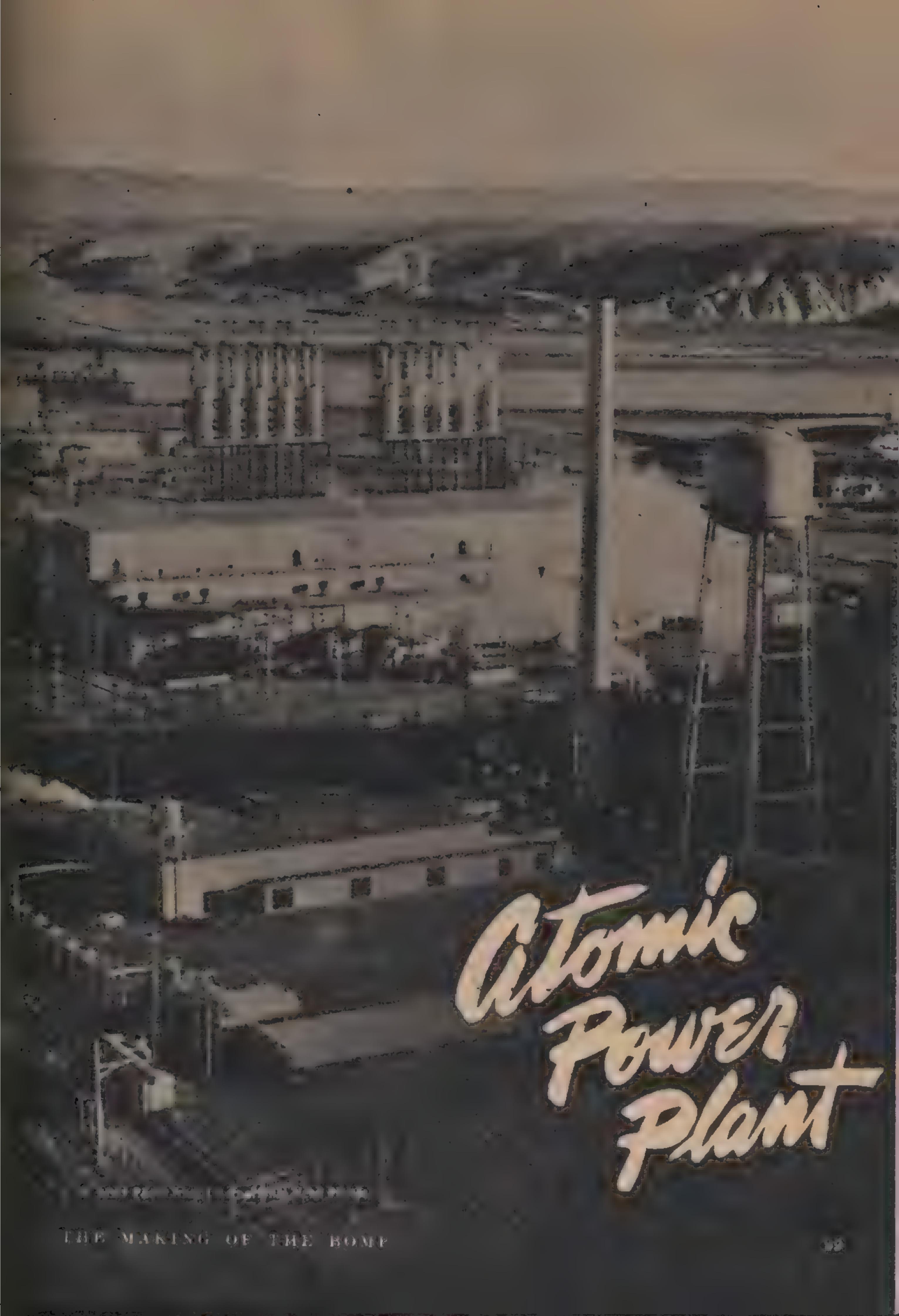
August, 1945

1.	World Of A	A. E. van Vogt	1.01
2.	Paradoxical Escape	Isaac Asimov	2.91
3.	Gift Horse	Ross Rocklynne	3.20
4.	Into Thy Hands	Lester del Rey	3.33
5.	Pipeline To Pluto	Murray Leinster	4.00

September, 1945

1.	World of A	A. E. van Vogt	1.000
2.	Camouflage	Lewis Padgett	2.12
3.	The Power	Murray Leinster	3.70
4.	Tie: Deadly Host	Raymond F. Jones	4.00
	The Infidels	Ross Rocklynne	
5.	Uncommon Sense	Hal Clement	4.50

THE EDITOR.



Atomic Power Plant

THE MAKING OF THE BOMB

The Making of the Bomb

This excerpt from the Smyth Report discusses the last stage of the problem of producing the atomic bomb; the mechanism whereby the uranium isotope U-235, or the synthetic element, plutonium, Pu-239, could be detonated. May we call to your attention that the essential principles employed in the bomb were described as the arming mechanism of the atomic bomb in the story "Deadline" in the March, 1944 Astounding.

The following material is a direct quotation of the chapter "The Work On the Atomic Bomb" from the report of Dr. Smyth. The entire report is written with a precise and careful understatement, and with a clarity and easy understandability that makes it first-class reading. It also represents the most important historical document in the history of Mankind; unfortunately the discoverers of fire were unable to record their researches that must have led them, gradually, to the realization that fire was a force to be tamed and used. Had those researches been recorded, there would have been a second document of importance comparable to that of the Smyth Report.

Since science-fiction specializes in the long-term view, I think our

readers can appreciate that the Magna Carta, the Constitution of the United States, and all the other great documents of Man's history can be classified as temporary material.

Since the Smyth Report is more than sixty thousand words long, we cannot print it in one piece. The integration of the material is such that it needs to be read in one, or at most two, sittings—certainly not with month-long lapses between. Therefore, Astounding cannot properly present the Report in full. This piece we do present is, essentially, a subsector report, concerning one of the side-issue researches into the possibilities and engineering methods of applying the power of the atom in one particular application.

That the particular application—



U. S. Army Photo from International News Photos

The Oak Ridge, Tennessee plant shown above was devoted to the separation of the fissionable isotope U-235 from the natural mixture of U-235 and U-238. Two methods were used, diffusion through barriers, and electromagnetic, each method working successfully and independently, each constituting a complete solution of the problem of getting atomic fuel for the bomb. On page 99 is shown part of the Hanford, Washington plant where U-238 was transmuted to plutonium, Pu-239 by the atomic by-products of U-235 fission. This process constituted a third complete solution. The United States actually solved the problem of the atomic bomb not once, but three separate times.

the atomic bomb—happened to be the immediate goal of the vast effort is quite beside the point. The main course of the development was directed toward achieving controlled use of atomic energy to produce the effect Man wanted, at the time and at the place Man wanted it, and to the degree Man wanted it.

In brief, the great objective was to learn how to turn the atom on and off at will.

The atomic bomb first tested on July 16, 1945, in New Mexico was not the first time men had turned atomic energy on and off at will; they had been doing that for two and a half years. The first atomic engine on Earth was built in the City of Chicago, and has been running regularly for nearly all the time since. It started operation on December 2, 1942. That first day, it was operated at a power

level of one half watt. On December 12th, the power was increased to two hundred watts. This first atomic engine was simply a heat engine, a uranian fire, and burned, as its fuel, the naturally-occurring mixture of uranium isotopes.

The design of the uranium pile is remarkably simple—blocks of special, high-purity graphite with lumps of high-purity uranium metal or oxide scattered through the pile in a latticework arrangement. Except for the special requirements of extreme purity, it seems rather surprising that someone somewhere didn't just accidentally come up with a uranium pile that mysteriously got hot.

The uranium atomic heat-engine, is controlled very handily by dampers. The dampers are slabs of neutron-absorbing material, either cadmium or boron in the form of boron-steel bars. Since the fission of uranium is initiated by neutrons, and produces the neutrons needed to maintain it, absorbing them cuts down the reaction.

There are many chapters to be written still, on the terrible chemical problem of extracting plutonium metal from the transmuted uranium in the uranium piles. The chemical

problem of handling any material so unimaginably deadly in its radioactivity was something as new on Earth as the uranium pile itself.

It is interesting to note that the transmutation of uranium to produce plutonium was the first atomic-power job tackled. The reaction is fairly simple, and was carried out on a minute scale—only a matter of pounds, not tens of thousands of tons—were transmuted. But even this appreciably raised the temperature of the Columbia River. Nuclear transmutations involving massive quantities of materials don't seem too practical, as Astounding mentioned once, long ago, because of the problem of disposing of the heat.

But by transmuting Uranium-238 into Plutonium-239, by extracting U-235 from other masses of uranium, using three different isotope-separation methods—a total of four different workable answers to the question of how to make an atomic bomb—the material needed for the Doomsday Bomb was gathered.

While it was gathering, another group was working on the problems involved in making it do as intended—explode.

This is the story of their work:

CHAPTER XII

THE WORK ON THE ATOMIC BOMB

The Objective

The entire purpose of the work described in the preceding chapters was to explore the possibility of creating atomic bombs and to produce the concentrated fissionable materials which would be required in such bombs. In the present chapter, the last stage of the

work will be described--the development at Los Alamos of the atomic bomb itself. As in other parts of the project, there are two phases to be considered: the organization, and the scientific and technical work itself. The organization will be described briefly;



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The test bomb explodes in New Mexico. This series of photographs was made by a battery of telescopic movie cameras at a distance of six miles. The appearance of the prints indicates that this shot and the one on page 105 were taken by one camera, set for somewhat greater exposure than the camera which took the succeeding pictures. Some detail shows in the sky and desert, indicating the exposure was sufficient for ordinary daylight to register. The black hole in the center of this shot, and the black measles on the next, are due to solarization—a photographic phenomenon. If film is exposed to a little light, it develops up gray; more light causes it to develop black. Much more light, and it is simply a more solid black. But if an enormous overexposure—thousands of times normal—will cause the photographic process to reverse itself, and bleach out the image. The black measles in the second photograph are due to this reversal, brought about by radiation from fragments of the bomb itself, radiating away the stupendous thermal energy of atomic disruption.



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The fragments of the bomb, at temperatures found in the heart of a star, are separating and cooling down to hundreds of thousands of degrees.

the remainder of the chapter will be devoted to the scientific and technical problems. Naturally, security considerations prevent a discussion of many of the most important phases of this work.

History and Organization

The project reorganization that occurred at the beginning of 1942, and the subsequent gradual transfer of the work from OSRD auspices to the Manhattan District have been described in Chapter V. It will be recalled that the responsibilities of the Metallurgical Laboratory at Chicago originally included a preliminary study of the physics of the atomic bomb. Some preliminary studies were made in 1941; and early in 1942 G. Breit got various laboratories (see Chapter VI) started on the experimental study of problems that had to be solved before progress could be made on bomb design. As has been mentioned in Chapter VI, J. R. Oppenheimer of the University of California gathered a group together in the summer of 1942 for further

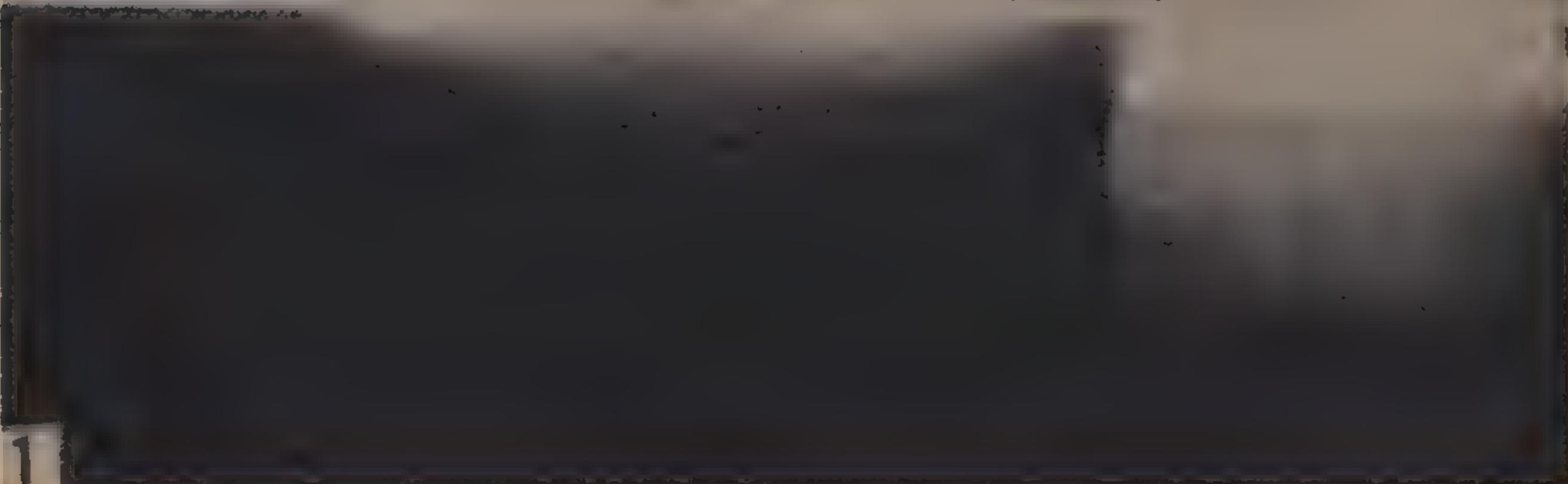
theoretical investigation and also undertook to coordinate this experimental work. This work was officially under the Metallurgical Laboratory, but the theoretical group did most of its work at the University of California. By the end of the summer of 1942, when General L. R. Groves took charge of the entire project, it was decided to expand the work considerably, and, at the earliest possible time, to set up a separate laboratory.

In the choice of a site of this atomic-bomb laboratory, the all-important considerations were secrecy and safety. It was therefore decided to establish the laboratory in an isolated location and to sever unnecessary connection with the outside world.

By November 1942 a site had been chosen--at Los Alamos, New Mexico. It was located on a mesa about twenty miles from Santa Fe. One asset of this site was the availability of considerable area for proving grounds, but initially the only structures on the site consisted of a handful of buildings which once constituted a small boarding school. There was no laboratory, no library, no shop, no adequate power plant. The sole means of approach was a winding mountain road. That the handicaps of the site were overcome to a considerable degree is a tribute to the unstinting efforts of the scientific and military personnel.

J. R. Oppenheimer has been director of the laboratory from the start. He arrived at the site in March 1943, and was soon joined by groups and individuals from Princeton University, University of Chicago, University of California, University of Wisconsin, University of Minnesota, and elsewhere. With the vigorous support of General L. R. Groves, J. B. Conant, and others, Oppenheimer continued to gather around him scientists of recognized ability, so that the end of 1944 found an extraordinary galaxy of scientific stars gathered on this New Mexican mesa. The recruiting of junior scientific personnel and technicians was more difficult, since for such persons the disadvantages of the site were not always counterbalanced by an appreciation of the magnitude of the goal; the use of Special Engineer Detachment personnel improved the situation considerably.

Naturally, the task of assembling the necessary apparatus, machines, and equipment was an enormous one. Three carloads of apparatus from the Princeton project filled some of the most urgent requirements. A cyclotron from Harvard, two Van de Graaff generators from Wisconsin, and a Cockcroft-Walton high-voltage

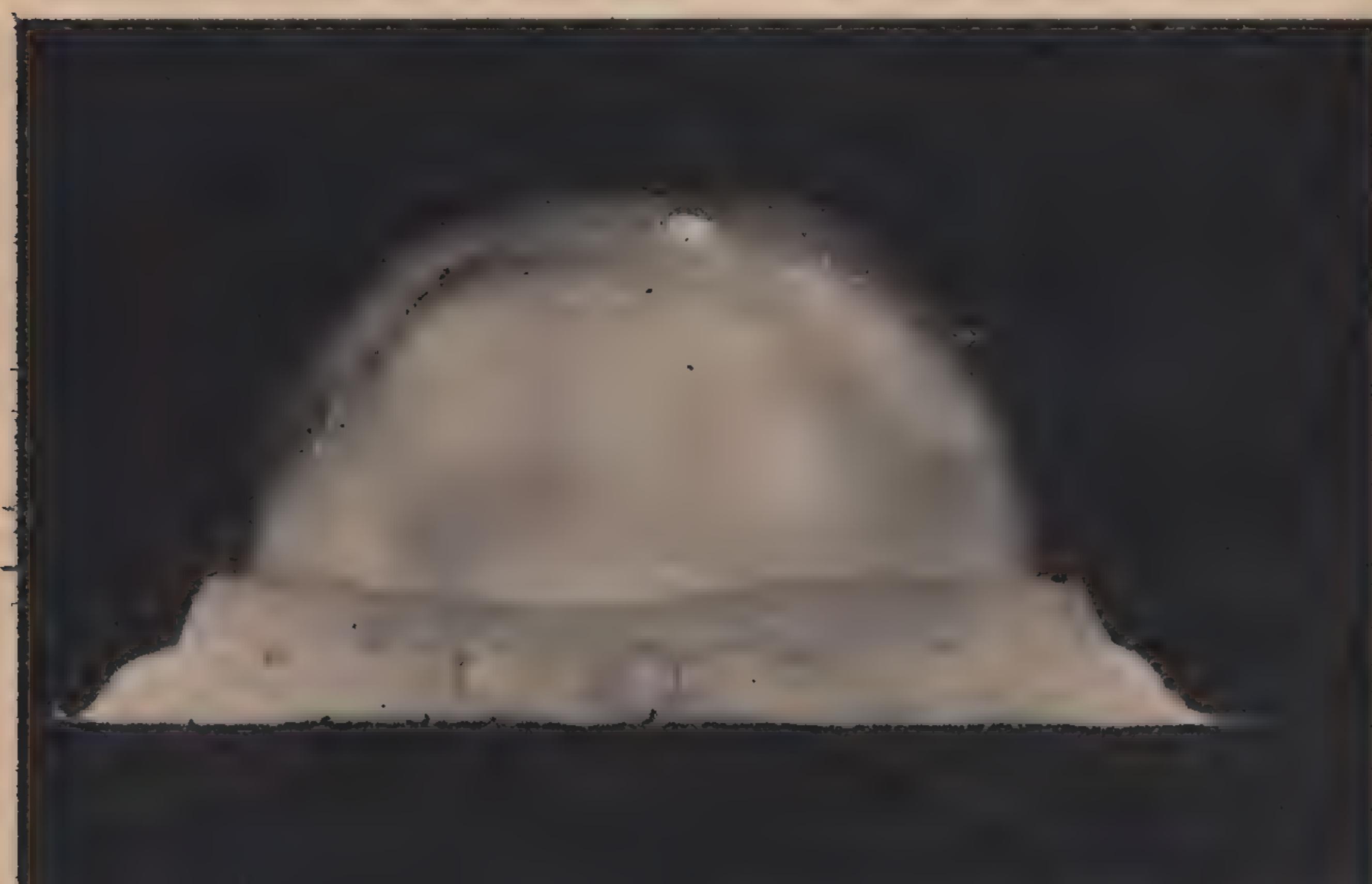


1

Another camera takes over. Note jet sky and landscape. White ghost at right is due to light reflected between the surfaces of the camera lens.

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The blast, spreading outward at the ultimate speed possible to air atoms, shows a nearly spherical shape distorted by minor, secondary explosion.



2



3

Further spread retains the shape, the skirt effect being due to the wave rebounding from the ground. Ordinary turbulence beginning at the edges.

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The turbulence spreads, and mushroom is beginning to form. Black surroundings represent relative intensity of atomic light brilliant desert sunlight!



4



The mushroom takes off for the stratosphere. Composed of enormously hot gases, it will rise 40,000 to 60,000 feet. Dark areas, and dark turbulence at base are cooler—but still brighter by far than full sunlight.

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device from Illinois soon arrived. As an illustration of the speed with which the laboratory was set up, we may record that the bottom pole piece of the cyclotron magnet was not laid until April 14, 1943, yet the first experiment was performed in early July. Other apparatus was acquired in quantity; subsidiary laboratories were built. Today this is probably the best-equipped physics research laboratory in the world.

The laboratory was financed under a contract between the Manhattan District and the University of California.

State of Knowledge in April 1943

General Discussion of the Problem

In Chapter II we stated the general conditions required to produce a self-sustaining chain reaction. It was pointed out that there are four processes competing for neutrons: (1) the capture of neutrons by uranium which results in fission; (2) non-fission capture by uranium; (3) non-fission capture by impurities; and (4) escape of neutrons from the system. Therefore the condition for obtaining such a chain reaction is that process (1) shall produce as many new neutrons as are consumed or lost in all four of

the processes. It was pointed out that (2) may be reduced by removal of U-238 or by the use of a lattice and moderator, that (3) may be reduced by achieving a high degree of chemical purity, and that (4) may be reduced (relatively) by increasing the size of the system. In our earlier discussions of chain reactions it was always taken for granted that the chain-reacting system must not blow up. Now we want to consider how to make it blow up.

By definition, an explosion is a sudden and violent release--in a small region--of a large amount of energy. To produce an efficient explosion in an atomic bomb, the parts of the bomb must not become appreciably separated before a substantial fraction of the available nuclear energy has been released. (For expansion leads to increased escape of neutrons from the system and thus to premature termination of the chain reaction.) Stated differently, the efficiency of the atomic bomb will depend on the ration of (a) the speed with which neutrons generated by the first fissions get into other nuclei and produce further fission, and (b) the speed with which the bomb flies apart. Using known principles of energy generation, temperature and pressure rise, and expansion of solids and vapors, it was possible to estimate the order of magnitude of the time interval between the beginning and end of the nuclear chain reaction. Almost all the technical difficulties of the project come from the extraordinary brevity of this time interval.

In earlier chapters we stated that no self-sustaining chain reaction could be produced in a block of pure uranium metal, no matter how large, because of parasitic capture of the neutrons by U-238. This conclusion has been borne out by various theoretical calculations and also by direct experiment: For purposes of producing a non-explosive pile, the trick of using a lattice and a moderator suffices--by reducing parasitic capture sufficiently. For purposes of producing an explosive unit, however, it turns out that this process is unsatisfactory on two counts. First, the thermal neutrons take so long (so many micro-seconds) to act that only a feeble explosion would result. Second, a pile is ordinarily far too big to be transported. It is therefore necessary to cut down parasitic capture by removing the greater part of the U-238--or to use plutonium.

Naturally, these general principles--and others--had been well established before the Los Alamos project was set up.



Hiroshima, before. The fine detail of individual factories, offices and houses is clearly visible in the original print. A city of 318,000, it was an important army port of embarkation in this and the Russo-Japanese war.

International News Photo



After the atomic bomb's dust had cleared. Notice particularly the effect on the moated castle, where the emperor stayed during the Russo-Japanese war a generation ago. A few concrete buildings remain as husks.

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Scraps of Hiroshima left after the blast. Hiroshima suffered even more than Nagasaki because, being a city on a river delta, it was table-flat, and perfectly exposed to the blast. Reinforced concrete buildings in background show astonishing resistance to the destruction.

Critical Size

The calculation of the critical size of a chain-reacting unit is a problem that has already been discussed in connection with piles. Although the calculation is simpler for a homogeneous metal unit than for a lattice, inaccuracies remained in the course of the early work, both because of lack of accurate knowledge of constants and because of mathematical difficulties. For example, the scattering, fission, and absorption cross sections of the nuclei involved all vary with neutron velocity. The details of such variation were not known experimentally and were difficult to take into account in making calculations. By the spring of 1943 several estimates of critical size had been made using various methods of calculation and using the best available nuclear constants, but the limits of error remained large.

The Reflector or Tamper

In a uranium-graphite chain-reacting pile the critical size may be considerably reduced by surrounding the pile with a layer of graphite, since such an envelope "reflects" many neutrons back into the pile. A similar envelope can be used to reduce the critical size of the bomb, but here the envelope has an additional role: its very inertia delays the expansion of the reacting material. For this reason such an envelope is often called a tamper. Use of a tamper clearly makes for a longer lasting, more energetic, and more efficient explosion. The most effective tamper is the one having the highest density; high tensile strength turns out to be unimportant. It is a fortunate coincidence that materials of high density are also excellent as reflectors of neutrons

Efficiency

As has already been remarked, the bomb tends to fly to bits as the reaction proceeds and this tends to stop the reaction. To calculate how much the bomb has to expand before the reaction stops is relatively simple. The calculation of how long this expansion takes and how far the reaction goes in that time is much more difficult.

While the effect of a tamper is to increase the efficiency both by reflecting neutrons and by delaying the expansion of the bomb, the effect on the efficiency is not as great as on the critical mass. The reason for this is that the process of reflection is relatively time-consuming and may not occur extensively before the chain reaction is terminated.

Detonation and Assembly

As stated in Chapter II, it is impossible to prevent a chain reaction from occurring when the size exceeds the critical size. For there are always enough neutrons (from cosmic rays, from spontaneous fission reactions, or from alpha-particle-induced reactions in impurities) to initiate the chain. Thus until detonation is desired, the bomb must consist of a number of separate pieces each one of which is below the critical size (either by reason of small size or unfavorable shape). To produce detonation, the parts of the bomb must be brought together rapidly. In the course of this assembly process the chain reaction is likely to start--because of the presence of stray neutrons--before the bomb has reached its most compact (most reactive) form. Thereupon the explosion tends



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Remains of a barber shop in Hiroshima. A tiled washstand and a few metal bits remain. Most rubble seems smashed to remarkably uniform size, as though some selective grinding action had been at work.

to prevent the bomb from reaching that most compact form. Thus it may turn out that the explosion is so inefficient as to be relatively useless. The problem, therefore, is twofold: (1) to reduce the time of assembly to a minimum; and (2) to reduce the number of stray (pre-detonation) neutrons to a minimum.

Some consideration was given to the danger of producing a "dud" or a detonation so inefficient that even the bomb itself would not be completely destroyed. This would, of course, be an undesirable outcome since it would present the enemy with a supply of highly valuable material.

Effectiveness

In Chapters II and IV it was pointed out that the amount of energy released was not the sole criterion of the value of a bomb. There was no assurance that one uranium bomb releasing energy equal to the energy

released by 20,000 tons of TNT would be as effective in producing military destruction as, say, 10,000 two-ton bombs. In fact, there were good reasons to believe that the destructive effect per calorie released decreases as the total amount of energy released increases. On the other hand, in atomic bombs the total amount of energy released per kilogram of fissionable material (i.e., the efficiency of energy release) increases with the size of the bomb. Thus the optimum size of the atomic bomb was not easily determined. A tactical aspect that complicates the matter further is the advantage of simultaneous destruction of a large area of enemy territory. In a complete appraisal of the effectiveness of an atomic bomb, attention must also be given to effects on morale.

Method of Assembly

Since estimates had been made of the speed that would bring together subcritical masses of U-235 rapidly enough to avoid predetonation, a good deal of thought had been given to practical methods of doing this. The obvious method of very rapidly assembling an atomic bomb was to shoot one part as a projectile in a gun against a second part as a target. The projectile mass, projectile speed, and gun caliber required were not far from the range of standard ordnance practice, but novel problems were introduced by the importance of achieving sudden and perfect contact between projectile and target, by the use of tampers, and by the requirement of portability. None of these technical problems had been studied to any appreciable extent prior to the establishment of the Los Alamos laboratory.

It had also been realized that schemes probably might be devised whereby neutron absorbers could be incorporated in the bomb in such a way that they would be rendered less effective by the initial stages of the chain reactions. Thus the tendency for the bomb to detonate prematurely and inefficiently would be minimized. Such devices for increasing the efficiency of the bomb are called auto-catalytic.

Summary of Knowledge as of April 1943

In April 1943 the available information of interest in connection with the design of atomic bombs was preliminary and inaccurate. Further and extensive theoretical work on critical size, efficiency, effect of tamper, method of detonation, and effectiveness was

urgently needed. Measurements of the nuclear constants of U-235, plutonium, and tamper material had to be extended and improved. In the cases of U-235 and plutonium, tentative measurements had to be made using only minute quantities until larger quantities became available.

Besides these problems in theoretical and experimental physics, there was a host of chemical, metallurgical, and technical problems that had hardly been touched. Examples were the purification and fabrication of U-235 and plutonium, and the fabrication of the tamper. Finally, there were problems of instantaneous assembly of the bomb that were staggering in their complexity.

The Work of the Laboratory

Introduction

For administrative purposes the scientific staff at Los Alamos was arranged in seven divisions, which have been rearranged at various times. During the spring of 1945 the divisions were: Theoretical Physics Division under H. Bethe, Experimental Nuclear Physics Division under R. R. Wilson, Chemistry and Metallurgy Division under J. W. Kennedy and C. S. Smith, Ordnance Division under Capt. W. S. Parsons (USN), Explosives Division under G. B. Kistiakowsky, Bomb Physics Division under R. F. Bacher, and an Advanced Development Division under E. Fermi. All the divisions reported to J. R. Oppenheimer, Director of the Los Alamos Laboratory who has been assisted in co-ordinating the research by S. K. Allison since December 1944. J. Chadwick of England and N. Bohr of Denmark spent a great deal of time at Los Alamos and gave invaluable advice. Chadwick was the head of a British delegation which contributed materially to the success of the laboratory. For security reasons, most of the work of the laboratory can be described only in part.

Theoretical Physics Division

There were two considerations that gave unusual importance to the work of the theoretical physics division under H. Bethe. The first of these was the necessity for effecting simultaneous development of everything from the fundamental materials to the method of putting them to use—all despite the virtual unavailability of the principal materials (U-235 and plutonium) and the complete novelty of the processes. The second consideration was the impossibility of

producing (as for experimental purposes) a "small scale" atomic explosion by making use of only a small amount of fissionable material. (No explosion occurs at all unless the mass of the fissionable material exceeds the critical mass.) Thus it was necessary to proceed from data obtained in experiments on infinitesimal quantities of materials and to combine it with the available theories as accurately as possible in order to make estimates as to what would happen in the bomb. Only in this way was it possible to make sensible plans for the other parts of the project, and to make decisions on design and construction without waiting for elaborate experiments on large quantities of material. To take a few examples, theoretical work was required in making rough determinations of the dimensions of the gun, in guiding the metallurgists in the choice of tamper materials, and in determining the influence of the purity of the fissionable material on the efficiency of the bomb.

The determination of the critical size of the bomb was one of the main problems of the theoretical physics division. In the course of time, several improvements were made in the theoretical approach whereby it was possible to take account of practically all of the complex phenomena involved. It was at first considered that the diffusion of neutrons was similar to the diffusion of heat, but this naive analogy had to be forsaken. In the early theoretical work the assumptions were made that the neutrons all had the same velocity and all were scattered isotropically. A method was thus developed which permitted calculation of the critical size for various shapes of the fissionable material provided that the mean free path of the neutrons was the same in the tamper material as in the fissionable material. This method was later improved first by taking account of the angular dependence of the scattering and secondly by allowing for difference in mean free path in core and tamper materials. Still later, means were found of taking into account the effects of the distribution in velocity of the neutrons, the variations of cross sections with velocity and inelastic scattering in the core and tamper materials. Thus it became possible to compute critical sizes assuming almost any kind of tamper material.

The rate at which the neutron density decreases in bomb models which are smaller than the critical size can be calculated, and all the variations mentioned above can be taken into account. The rate of

approach to the critical condition as the projectile part of the bomb moves toward the target part of the bomb has been studied by theoretical methods. Furthermore, the best distribution of fissionable material in projectile and target was determined by theoretical studies.

Techniques were developed for dealing with set-ups in which the number of neutrons is so small that a careful statistical analysis must be made of the effects of the neutrons. The most important problem in this connection was the determination of the probability that, when a bomb is larger than critical size, a stray neutron will start a continuing chain reaction. A related problem was the determination of the magnitude of the fluctuations in neutron density in a bomb whose size is close to the critical size. By the summer of 1945 many such calculations had been checked by experiments.

A great deal of theoretical work was done on the equation of state of matter at the high temperatures and pressures to be expected in the exploding atomic bombs. The expansion of the various constituent parts of the bomb during and after the moment of chain reaction has been calculated. The effects of radiation have been investigated in considerable detail.

Having calculated the energy that is released in the explosion of an atomic bomb, one naturally wants to estimate the military damage that will be produced. This involves analysis of the shock waves in air and in earth, the determination of the effectiveness of a detonation beneath the surface of the ocean, etc.

In addition to all the work mentioned above, a considerable amount of work was done in evaluating preliminary experiments. Thus an analysis was made of the back-scattering of neutrons by the various tamper materials proposed. An analysis was also made of the results of experiments on the multiplication of neutrons in subcritical amounts of fissionable material.

Experimental Nuclear Physics Division

The experiments performed by the Experimental Nuclear Physics group at Los Alamos were of two kinds: "differential" experiments as for determining the cross section for fission of a specific isotope by neutrons of a specific velocity, and "integral" experiments as for determining the average scattering

of fission neutrons from an actual tamper.

Many nuclear constants had already been determined at the University of Chicago Metallurgical Laboratory and elsewhere, but a number of important constants were still undetermined--especially those involving high neutron velocities. Some of the outstanding questions were the following:

1. What are the fission cross sections of U-234, U-235, U-238, Pu-239, etc.?

2. What are the elastic scattering cross sections for the same nuclei (also for nuclei of tamper materials)? How do they vary with neutron velocity?

3. What are the inelastic cross sections for the nuclei referred to above?

4. What are the absorption cross sections for processes other than fission?

5. How many neutrons are emitted per fission in the case of each of the nuclei referred to above?

6. What is the full explanation of the fact that the number of neutrons emitted per fission is not a whole number?

7. What is the initial energy of the neutrons produced by fission?

8. Does the number or energy of such neutrons vary with the speed of the incident neutrons?

9. Are fission neutrons emitted immediately?

10. What is the probability of spontaneous fission of the various fissionable nuclei?

In addition to attempting to find the answers to these questions the Los Alamos Experimental Nuclear Physics Division investigated many problems of great scientific interest which were expected to play a role in their final device. Whether or not this turned out to be the case, the store of knowledge thus accumulated by the Division forms an integral and invaluable part of all thinking on nuclear problems.

Experimental Methods. The earlier chapters contain little or no discussion of experimental techniques except those for the observing of fast (charged) particles (See Appendix 1.). To obtain answers to the ten questions posed above, we should like to be able to:

- (1) determine the number of neutrons of any given energy;
- (2) produce neutrons of any desired energy;
- (3) determine the angles of deflection of scattered neutrons;
- (4) determine the number of fissions occurring;

(5) detect other consequences of neutron absorption, e.g., artificial radioactivity.

We shall indicate briefly how such observations are made.

Detection of Neutrons. There are three ways in which neutrons can be detected: by the ionization produced by light atomic nuclei driven forward at high speeds by elastic collisions with neutrons, by the radioactive disintegration of unstable nuclei formed by the absorption of neutrons, and by fission resulting from neutron absorption. All three processes lead to the production of ions and the resulting ionization may be detected using electroscopes, ionization chambers, Geiger-Miller counters, Wilson cloud chambers, tracks in photographic emulsion, etc.

While the mere detection of neutrons is not difficult, the measurement of the neutron velocities is decidedly more so. The Wilson cloud chamber method and the photographic emulsion method give the most direct results but are tedious to apply. More often various combinations of selective absorbers are used. Thus, for example, if a foil known to absorb neutrons of only one particular range of energies is inserted in the path of the neutrons and is then removed, its degree of radioactivity is presumably proportional to the number of neutrons in the particular energy range concerned. Another scheme is to study the induced radioactivity known to be produced only by neutrons whose energy lies above a certain threshold energy.

One elegant scheme for studying the effects of neutrons of a single, arbitrarily-selected velocity is the "time of flight" method. In this method a neutron source is modulated, i.e., the source is made to emit neutrons in short "bursts" or "pulses."

In each pulse there are a great many neutrons--of a very wide range of velocities.) The target material and the detector are situated a considerable distance from the source (several feet or yards from it). The detector is "modulated" also, and with the same periodicity. The timing or phasing is made such that the detector is responsive only for a short interval beginning a certain time after the pulse of neutrons leaves the source. Thus any effects recorded by the detector (e.g., fissions in a layer of uranium deposited on an inner surface of an ionization chamber) are the result only of neutrons that arrive just at the moment of responsibility and therefore have trav-

elled from the source in a certain time interval. In other words, the measured effects are due only to the neutrons having the appropriate velocity.

Production of Neutrons. All neutrons are produced as the result of nuclear reactions, and their initial speed depends on the energy balance of the particular reaction. If the reaction is endothermic, that is, if the total mass of the resultant particles is greater than that of the initial particles, the reaction does not occur unless the bombarding particle has more than the "threshold" kinetic energy. At higher bombarding energies the kinetic energy of the resulting particles, specifically of the neutrons, goes up with the increase of kinetic energy of the bombarding particle above the threshold value. Thus the $\text{Li}^7 (\text{p},\text{n}) \text{Be}^7$ reaction absorbs 1.6 Mev energy since the product particles are heavier than the initial particles. Any further energy of the incident protons goes into kinetic energy of the products so that the maximum speed of the neutrons produced goes up with the speed of the incident protons. However, to get neutrons of a narrow range of speed, a thin target must be used, the neutrons must all come off at the same angle, and the protons must all strike the target with the same speed.

Although the same energy and momentum conservation laws apply to exothermic nuclear reactions, the energy release is usually large compared to the kinetic energy of the bombarding particles and therefore essentially determines the neutron speed. Often there are several ranges of speed from the same reaction. There are some reactions that produce very high energy neutrons (nearly 15 Mev).

Since there is a limited number of nuclear reactions usable for neutron sources, there are only certain ranges of neutron speeds that can be produced originally. There is no difficulty about slowing them down uniformly, that is, without spreading out the velocity distribution. The most effective slowing-down scheme is the use of a moderator, as in the graphite pile; in fact, the pile itself, is an excellent source (i.e., very low speed) or nearly thermal neutrons.

Determination of Angles of Deflection. The difficulties in measuring the angles of deflection of neutrons are largely of intensity and interpretation. The number of neutrons scattered in a particu-

lar direction may be relatively small, and the "scattered" neutrons nearly always include many strays not coming from the intended target.

Determination of Number of Fissions. The determination of the number of fissions which are produced by neutrons or occur spontaneously is relatively simple. Ionization chambers, counter tubes, and many other types of detectors can be used.

Detection of Products of Capture of Neutrons. Often it is desirable to find in detail what has happened to neutrons that are absorbed but have not produced fission, e.g., resonance or "radiative" capture of neutrons by U-239 which leads to the production of plutonium. Such studies usually involve a combination of microchemical separations and radioactivity analyses.

Some Experiments on Nuclear Constants. By the time that the Los Alamos laboratory had been established, a large amount of work had been done on the effects of slow neutrons on the materials then available. For example, the thermal-neutron fission cross section of natural uranium had been evaluated, and similarly for the separated isotopes of uranium and for plutonium. Some data on high-speed-neutron fission cross sections had been published, and additional information was available in project laboratories. To extend and improve such data, Los Alamos perfected the use of the Van de Graaff generator for the Li⁷ (p,n) Be⁷ reaction, so as to produce neutrons of any desired energy lying in the range from 3000 electron volts to two million electron volts. Success was also achieved in modulating the cyclotron beam and developing the neutron time-of-flight method to produce (when desired) effects of many speed intervals at once. Special methods were devised for filling in the gaps in neutron energy range. Particularly important was the refinement of measurement made possible as greater quantities of U-235, U-238 and plutonium began to be received. On the whole, the values of cross section for fission as a function of neutron energy from practically zero electron volts to three million electron volts is now fairly well known for these materials.

Some Integral Experiments. Two "integral experiments" (experiments on assembled or integrated

systems comprising fissionable material, reflector, and perhaps moderator also) may be described. In the first of these integral experiments a chain-reacting system was constructed which included a relatively large amount of U-235 in liquid solution. It was designed to operate at a very low power level, and it had no cooling system. Its purpose was to provide verification of the effects predicted for reacting systems containing enriched U-235. The results were very nearly as expected.

The second integral experiment was carried out on a pile containing a mixture of uranium and a hydrogenous moderator. In this first form, the pile was thus a slow-neutron chain-reacting pile. The pile was then rebuilt using less hydrogen. In this version of the pile, fast-neutron fission became important. The pile was rebuilt several more times, less hydrogen being used each time. By such a series of reconstructions, the reaction character was successively altered, so that thermal neutron fission became less and less important while fast neutron fission became more and more important--approaching the conditions to be found in the bomb.

Summary of Results on Nuclear Physics. The nuclear constants of U-235, U-238, and plutonium have been measured with a reasonable degree of accuracy over the range of neutron energies from thermal to three million electron volts. In other words, questions 1, 2, 3, 4, and 5 of the ten questions posed at the beginning of this section have been answered. The fission spectrum (question 7) for U-235 and Pu-239 is reasonably well known. Spontaneous fission (question 10) has been studied for several types of nuclei. Preliminary results on questions 6, 8, and 9, involving details of the fission process, have been obtained.

Chemistry and Metallurgy Division

The Chemistry and Metallurgy Division of the Los Alamos Laboratory was under the joint direction of J. W. Kennedy and C. S. Smith. It was responsible for final purification of the enriched fissionable materials, for fabrication of the bomb core, tamper, etc., and for various other matters. In all this division's work on enriched fissionable materials especial care had to be taken not to lose any appreciable amounts of the materials (which are worth much more than gold). Thus the procedures already well-

established at Chicago and elsewhere for purifying and fabricating natural uranium were often not satisfactory for handling highly-enriched samples of U-235.

Ordnance, Explosives, and Bomb Physics Divisions

The above account of the work of the Theoretical Physics, Experimental Nuclear Physics, and Chemistry and Metallurgy Divisions is somewhat incomplete because important aspects of this work cannot be discussed for reasons of security. For the same reasons none of the work of the Ordnance, Explosives, and Bomb Physics Divisions can be discussed at all.

Summary

In the spring of 1943 an entirely new laboratory was established at Los Alamos, New Mexico, under J. R. Oppenheimer for the purpose of investigating the design and construction of the atomic bomb, from the stage of receipt of U-235 or plutonium to the stage of use of the bomb. The new laboratory improved the theoretical treatment of design and performance problems, refined and extended the measurements of the nuclear constants involved, developed methods of purifying the materials to be used, and, finally, designed and constructed operable atomic bombs.

THE END





Trouble Times Two

by GEORGE O. SMITH

A schizophrenic is a man with two personalities. Thomas Lionel was a physicist; Tom Lionel was an engineer. Unfortunately, they inhabited the same body—and Tom's objection was they used the same bank account. His.

Illustrated by Raymond

Thomas Lionel Ph.D., M.M. bounded out of bed with a cheerful bit of off-tune song. He glanced at the calendar and then the clock and he grinned because life was just too good to be true.

Everything was according to plan.

He'd won his first battle. Up to now it had been touch and go; at last he had established his right to co-occupy the mind along with the engineer. No longer could the engineer claim that he was an expensive detriment. He had forced

the engineer into agreeing that his offering, though not directly productive, was a causative factor in the development of success. Then to top it all, he retained enough technology to be a necessary item. He must be permitted to remain if only for a source of information.

The engineer's trap had been excellent. But the trap had turned and caught the engineer. Those reams of data on the poltergeist effect had been the basis for an entirely new science that only a real physicist could appreciate—and no engineer could hope to thread his way through them without a research physicist's assistance.

He stood over the chessboard in the living room for a few minutes. The engineer was not making any great moves. Therefore the physicist thought that he might best consolidate his position. He castled to the queen's side, burying his king behind a bulwark of defenses that would defy a master chess player to penetrate in less than ten or fifteen moves.

During breakfast, he perused a thin volume of recent publication. He did not entirely agree with the theories presented; after all, the book had been written for the express purpose of getting reader's viewpoints and Thomas knew it. In fact, the book was not too interesting to Thomas but he knew that the engineer would fume, fret, and howl at the idea of having a well-thumbed volume of "*Theory of Multi-Resonant Wave Guides*" in the library.

Thomas wouldn't look at the en-

gineer's volume, laying on the table opposite. It was too un-physical. It was un-erudite. It was "*Basic Theory in Micro-Wave Transmission*" and the edges of the pages were loaded with application formulas, diagrams, and working sketches.

He was near the end of breakfast when the glint of reflected sunshine arrowed through the window and caught his eye. He looked, and wondered who was landing on his lawn in a helicopter.

Then he did a double take.

"Helicopter" stemmed from Greek, the "helix" or screw plus the "opter" a machine. This contrivance did not. It was not operated with air screws.

It looked like a three-wheeled coupé. It looked like the industrial designer's dream of the Plan For Tomorrow, excepting those three wheels. The Plan For Tomorrow should, by all rights, have four wheels. And, if the thing is going to fly, it should have some sort of overhead vanes, or wings, or engines, or jets, or even a skyhook. But there it was, coming down as light as a feather to make a neat landing on the back lawn.

By the time the door was open, and the passenger stepped to the ground, Thomas was standing before the little sky car, looking somewhat dazed at the name:

POLTERGEIST

"Like a dream," said the driver of the sky car.

"It should," said Thomas, cover-

ing his ignorance with monosyllabic agreement.

"Handles well, too. I think we could stand a bit more positivity of control, though."

"I'll look into it."

"I wish you would. We've got the jump on the whole world with this. We'd like to keep it. But the thing doesn't answer to the wheel too solidly."

"Uh-huh."

"The chief engineer said, 'Jim, take that crate over to Lionel and see if he will beef up the control force a bit.' So here I am."

"O.K., Jim," said Thomas, offering a prayer for the name that had been given unwittingly. The engineer must have been a busy boy! "How are you going to get back?"

Jim looked up into the sky. "Jerry is following in the pilot model. He'll pick me up and we'll go on back thataway."

Jim nodded skyward, and Thomas looked at the growing speck that must have been the pilot model.

Thomas forgot about the pilot model. What he wanted to know was the whereabouts of the five tons of equipment that had been an integral part of this idea. He looked at the model. He wondered whether the engineer had installed the whole thing, stepping up the power and using the main part of the power to support the equipment. That did not seem possible. Any failure would cause the little sky car to collapse of its own dead weight. Besides there was not enough room in the little crate to pack all that equipment-tonnage.

The engineer had achieved the impossible. He had done away with the main part while retaining the effect.

The pilot model landed. It was not the finished job of the prototype. The cabin was squarely functional and the landing wheels were not faired into the hull. The rear end, instead of tapering gently into a narrow paraboloid of revolution, was a truncated four-sided pyramid.

Jerry did not emerge. He merely tossed the door open and shouted: "Come on—we ain't got all day!"

Thomas nodded. "I'll call you when I get it fixed."

Call who? the physicist wondered, and then forgot about it. He wanted desperately to dig into the sky car. He wanted to find out where the engineer had packed five tons of equipment. He wanted to see what made the wheels go around. No doubt the thing could be returned to its owners without calling in the police. The thing was probably recorded in the precisely kept engineering notebook of the physicist's alter ego.

The pilot model was not completely out of sight before Thomas had the power cowls off, and the whole model stripped of its servicing doors. They had done an excellent job of design; the sky car without its servicing panels was but a skeleton frame, with every line, every connection, and every control rod open for easy servicing.

And it was then and there that the physicist understood what the engineer had been doing.

Instead of the low-voltage high-current supply lines, with their attendant heavy busbars, thin pipes ran about the sky car. Seamless aluminum tubing carried the energizing current. Or, rather the space inside of the tubing carried it. At the generator end, a ten megawatt microwave generator supplied high power at ultra high frequency. At the terminus, rectifiers brought the ultra high frequency down to direct current for operation of the force-field generators.

Thomas nodded. It was not the final tenth of one percent job. It was not direct current. The diagravitic force was not constant. It operated only seven tenths of the time, and was turned off and on fifteen or twenty million million times per second. Nothing short of high-definition test equipment would ever tell the difference, however.

Gone were the massive electromagnetic deflection field coils. In their place was a set of seventy kilovolt electrostatic plates.

Missing entirely were the variable-speed motor generators. In their place was a simple crystalline formation under permanent magnetic stress. "Artificial radio-activated crystals," muttered Thomas. "Good for a couple of years."

But the feed lines. *The feed lines.* The current carrying ability of space itself—not the metallic conductor—did the trick. Using the ultra high frequency bands, the busbars had been replaced with

cylindrical wave guides. The depth of penetration was measured in microns at those frequencies—and as long as the guides were properly designed, they offered little loss in power. The current went down the wave guides by virtue of the magnetic fields created throughout the guides—magnetic fields generated in the space inside of the tubular guides.

The generator itself was one of the new crystal microwave generators and the rectifiers at the receiving end were of the same ilk.

And the five tons of equipment had vanished in a puff of tubular guides, electrostatic plates, and intermittent operation.

Thomas hit a snag for a moment. The engineer had answered his challenge. So he'd come up with the answer to the five-ton-per-fifty-pound answer—and had gone further. Thomas knew that there was no apparent limit to the maximum power or lift. It merely set a fifty pound minimum—actually it was 49.87 pounds by measurement—under which limit no amount of tinkering would produce the effect.

He smiled. There must be something beyond. After all, small stones moved quietly in natural poltergeist manifestation; they would be able to reproduce that eventually. But for now, the engineer was willing to accept the limitation whereas the physicist would not.

He knew now. And he'd leave the sky car until the engineer returned. Let *him* beef up the control force. It was *his* baby.

Thomas put the panels back on the sky car and stood off to admire it. It was a neat job, just what the public wanted. The urge to get in and drive was a most compelling one, and Thomas succumbed. He sat for a moment, inspecting the dashboard until he had the pattern well set. Then he snapped on the power, took the wheel and pulled back gently. The sky car lifted its nose slightly, and as Thomas pressed the foot pedal, it took off on a side-line straight into the sky. He leveled off at a thousand feet and he did some scurrying back and forth in midair. It did handle a little sloppy but not enough to make the physicist uncomfortable. Yet it wouldn't stand any hedge-hopping or bridge-undercutting without a prayer on the part of the driver. Butter the controls a bit and you could thread a needle with it on the first try.

Yes, the engineer had done it again—all of which made Thomas chuckle. A bit more of this and the engineer would have such an income that he'd no longer worry himself into engineering. Then—

Thomas turned the sky car and drove across the city toward Dr. Hamilton's place. He landed on the psychiatrist's lawn and startled the doctor out of a week's growth.

"I've won," he told the doctor.

"Good," laughed Hamilton. "Mind if I ask which you are today—and how do you know you've won?"

"I'm Thomas Lionel, Ph.D. And the engineer has worked himself out of a job."

"Interesting. But how?"

"He dropped me a mess of cockeyed data, remember? Well, I unraveled it into a most interesting field of science. From it I handed him a slab full of theories and experiments that are just inefficient enough to make him fume. He's come up with several things that make money in vatfuls."

"That, I know and understand. Go on."

"Remember, I am his ideal personality. I am a physicist, a type of person he has always wanted to be. He couldn't be a physicist because of financial reasons and so he went into the engineering field to bolster up his bank account. That was eminently practical. But now that the worry about the bankroll is over, he can turn to theoretical physics and physical research. That's me—and I've won!"

"Suppose he, himself, takes the gradual retreat from engineering into physical research?"

"Um—I don't think he's capable of it. He's been too well conditioned."

"Might well be," admitted the doctor. "Well, as I said before, I'm just a referee. Both of you are well adjusted and good, worthy additions to society. Either one of you that wins will be a credit to civilization."

"You're a great help," laughed Thomas. "But I don't mind. This is my round, and it's my game. He's licked himself."

"I'll tell him that when I see him," said Dr. Hamilton. "But there is one thing that I must know.



I want to know what makes that little tungsten box work."

"I cast the tungsten in—"

"I don't care how you made it," said Hamilton flatly, "unless it has a definite bearing on how it works."

"I made it of tungsten because the engineer would rip it apart if it weren't too tough," grinned Thomas. "Being of tungsten it doesn't matter how it works excepting it would have been more

efficient if I'd made it of silver."

"Look, Thomas, stay on the subject. I want to know what's with the works."

Lionel laughed. "What's so important?"

"Look, man, I'm a psychiatrist. The functioning of the human mind is my baby. Or," he added bitterly, "it should be. But, darn it, all we can do is to surmise, theorize, hope and pray. We don't know what makes schizophrenics, or manic-depressives or any of the other mental quirks. We aren't even certain why some people are well liked while others, of almost identical get-together are heartily disliked. But you've come up with a little dingus that causes a switch-over from one personality to another merely by pushing a button. Find out why and we psychiatrists may some day get to first base in psychoanalysis."

"Um— I suppose a real pathophone would be a help."

"Pathophone is a good word," smiled the psychiatrist, "but to dig into a warped mind without having the erroneous impressions and false evaluation clouding the only entry . . . we'd be able to clear up almost any mental condition. Now, how does it work?"

"I am not prepared to say. I was seeking experimental data on the 'epicenter' of the poltergeist phenomena—the poltergeist usually manifests in the vicinity of or because of some central influence—usually a person who is unaware of his potentiality. At any rate, I was setting up a series of local magnetic

and electrostatic fields and then trying the micro-microwave spectrum for response. I was running up through the region between long heat radiation and micro-micro radio waves when—blooey!— I was the engineer. I switched back eventually and consolidated my findings into that little tungsten box."

"I want the dope on it."

"I'll give it to you," nodded Thomas. "As soon as I make some final measurements and consolidate my data."

"Fine. Mind telling me what causes the poltergeist?"

"As best I can. The present concept of space is that space itself is under internal strain. Force vectors in cancellation prevail, resulting in a stable continuum. Space is warped by electrostatic effects, magnetic effects, and gravitic effects. These local effects do not create a discontinuity in the space strain, and therefore no eruption takes place. Now enters the epicenter. Radiation from his mind or brain in thinking goes out and starts a very minor sympathetic oscillation in the warps and strains of space. If these strains are in the right vectorial situation, the minor oscillation builds up the response amplitude—"

"That doesn't make sense," objected the doctor. "Mental radiation must be weak. How can it induce high power?"

"It can't. But if you know radio at all, you'll recall that a high 'Q' circuit will develop very high volt-

ages across the terminals with a very small driving voltage. Well, this is analogous to the epicenter effect. The epicenter wave causes instability in the space strains because the brain wave is not a natural phenomena of space. Then—like two sticks end to end under compression, it takes very little sidewise thrust to make the compression-force collapse, forcing the sticks out at right angles. Follow?"

"But where did this energy or force come from?" puzzled Hamilton. "Isn't that a violation of the Law of Conservation of Energy?"

"Not at all. The law is still valid. It does state that you cannot get more out of anything than is put into it. The guesswork comes in deciding how the energy got there. Coal, for instance, is just a black stone. It has potential energy which was put into it by the eons of solar energy shining on the carboniferous forests. A stone has potential energy for falling. Where did it get it? It may have been carried up the hill; it may have been dropped from space—put out there by the cosmic eruption that caused Creation. Or it may have been on the edge of a gully and the potential drop made by the stream eroding the ground out from under it."

"How about atomic power?"

"You mean, how did the power get locked in the atom?"

"Yes."

"The power in the atom was put there by the universe's atom factories. Sol, and the other suns," explained Hamilton.

"But where did the earth—?"

"Creation," murmured Thomas. "Who knows? I don't. Every time somebody comes up with a perfect answer, someone else comes up with perfect data that proves that the answer couldn't be *anything* that anybody has ever used before.

"The atom factory is the Solar Phoenix. You start with hydrogen and carbon. The solar heat is such that they combine atomically to an unstable isotope of nitrogen which immediately becomes a stable isotope of nitrogen. More hydrogen gets in, making it unstable oxygen and so forth. Oxygen breaks down, releasing energy, helium, and, what do you know, carbon again, which begins to take on hydrogen again, and here we go again. But the thing is uncontrolled hell on wheels. Things go wrong due to the variances of pressure and temperature, and the oxygen doesn't always break down into helium and carbon. It takes offshoots and sidetracks. It'll add hydrogen and become fluorine, for instance, which then adds more and becomes something else, some of which trails off like the branches of a tree and do not break down into recurrent reactions. Hence the other atoms."

"I'll read about it and get the real picture. Know a good book?"

Thomas scratched his chin. "If you can find a copy of 'The Days of Creation,' by Willy Ley, the first part of the book has a description of the Solar Phoenix."

"Well, good enough," said Dr. Hamilton. "But just bear one thing in mind. You think you've beaten the engineer. Your basic trouble

is just that the engineer is you, too. He has your ability and your knowledge and your experience upon which to work. He is no fool, and you can take that as a back-handed compliment if you want to. He is just as capable an engineer as you are a physicist. He thinks in different channels, I will admit. But, Thomas, remember that his extra-channellar thinking is done with the same thinking equipment as yours is, and it is no less efficient because of being divergent from your own thought-track. Your battle was won too easily to be conclusive."

"What do you expect?"

"I wouldn't know. I'm no scientist in physics." Hamilton held up a hand as Thomas started to protest. "I use 'scientist' despite your dislike of the word only because there is no term that describes both of the attributes of practical engineer and research physicist. Frankly, I'm hoping for an eventual coalition, but I fear not."

"Why view no-coalition with distaste?" demanded Thomas.

"Because both personalities offer much to the world, to science in general, and to the body that houses both of them."

"I heartily dislike all aspects of practical engineering," stated Thomas flatly. "To be everlastingly forced to retrace your own steps, again and again and again, working out the most insignificant details—bah!"

"The engineer has another viewpoint."

"I know. But the engineer in

this case is here only because of his own necessity—which he himself has removed. I am the real entity; I am the desire of the engineer. I am what he wants to be. *I am what he will become!*"

"Good morning, Frank."

"Morning, Miss Elaine. Mr. Lionel isn't here."

"He'll be back?" asked the girl.

"Oh yes. He went over to see Dr. Hamilton."

"Oh, Frank, the usual question?"

"This morning he is Thomas Lionel, Ph.D., M.M."

"Oh."

"He went to bed Tom Lionel, Consulting Engineer."

"I wonder if he remembers," smiled Elaine.

The *Poltergeist* landed on the lawn. It was silent, but a flash of sunshine caught the sleek side and attracted Elaine's attention.

"Hi," she called as she emerged from the house.

"Howdy," he answered. "What brings you out?"

"Never ask a girl a question like that," she laughed. "You'll never get the right answer."

"Why?"

"If she says 'you' it's either a lie or she's the kind of girl your mother tried to protect you from. If she says anything else, it's either a lie or she's the kind of girl your mother tried to protect you from."

"A man can't win," snorted Thomas.

"Does a man really want to win?"

"Nope," admitted Thomas. "I

won't ask questions, Elaine. I'll just be glad you came."

"I'm glad you're glad."

Elaine flirted with him shamelessly, and then turned toward the laboratory building. He followed, and they kept up a running fire of light talk all the way.

"The first thing I have to do is to see what the engineer was doing last," remarked Thomas as he opened the laboratory door.

"You are a strange fellow," smiled Elaine. "You respect each other's possessions and beliefs, though you argue madly through impersonal mediums. Still writing nasty letters?"

"Uh-huh. And playing chess."

"What's he been doing?" asked Elaine innocently.

"Don't really know. Aside from some experiments on the poltergeist effect—reducing them to practice—I wouldn't know. I doubt that he's been doing much else. I do happen to know that he's deeply interested in the epicenter effect. He may find the key to it, too."

The laboratory was about as he remembered it. There were some changes. A few of the pieces of equipment were moved; some of them were converted; and a couple of them had been built in to other, larger pieces. All of the workmanship was clean and shining.

The cyclospectrograph had been worked on with a vengeance. It had lost its haywire appearance. The D plates were all neatly machined and the high frequency plumbing was all rearranged into mathematical and technical sym-

metry. The hours-use counter showed constant operation for several days solid, which interested the physicist.

"He's found a use for it," he grinned at Elaine.

"He finds a use for most everything," she said. "He's a pretty sharp man."

"Thanks," grinned Thomas, recalling what the psychiatrist had said regarding the mutual efficiency of the mind in Thomas Lionel's body.

"Wonder what this crystal is," muttered Thomas.

"Looks like a natural quartz"

"Might be—though I doubt it."

"Can you find out?"

"Eventually. If it is interesting, I will. What bothers me mostly, though," said Thomas thoughtfully, "are two things. One of them is that open drum of gooey tar. The other one is that vat of used motor oil."

"The oil I understand. But what is the tarlike goo?"

"I forget its name. It is one of the natural asphalt family and it ranks high—along with chewing gum—among those substances in which I would least like to bathe."

"Um. I detect a tone of distaste" laughed Elaine. "Here's another little tricky gadget. Looks sort of like your tungsten box."

"Oh?" asked Thomas.

"Yes . . . say, Tommy, what's an epicenter?"

"Ah . . . why?" asked the physicist, his attention on the cyclospectrograph.

"This box has a little sign on it.

It says: 'Be an epicenter' and some other stuff."

"The epicenter is the main feature around which the phenomena revolves," explained Thomas idly.

"Oh."

Elaine fondled the little box. Her forefinger touched the button, felt its smoothness. In her mind was knowledge of the dire effects caused by tyros who push strange buttons. Certainly there was no curiosity deep enough to override her own good sense. But subconsciously the natural impulse to touch wet paint, to kick the package on the sidewalk, came to the fore and Elaine stood there, looking the box over with her forefinger set against the button.

"'Be an epicenter,'" she repeated.

It registered. Like a swift montage, events past, present and future sped through Thomas Lionel's mind. He went from the basic idea to the foregone conclusion in three lightning-quick steps.

"*NO!*" he yelled.

But it was too late.

And through his mind there passed a vision that made him swallow. Elaine—dressed in a simple frock of printed silk, garnished from the top of her beautifully coiffed hair to the bottoms of her exquisitely shod feet in an awful mixture of used crankcase oil and a tar-asphaltum—

In vain he tried to cross the twenty feet that separated him from the girl. In vain he tried to get there, to snatch that devilish box from her hand, to grab it and hurl

it far enough away so that the effect wouldn't even cause a bad splash.

The idea of seeing her all gooed up. That made him shout hoarsely.

It shouldn't happen to a dog—

And then it hit him. He was fully fifteen feet from the girl and her little instrument. A half-hour's observational time went into milliseconds in Thomas Lionel's mind as he watched the open drum of asphaltum compound rise out of the open top in a parabolic arc. It arched high, just missing the ceiling, and passing in an ogee curve to miss a stanchion. Forward it came, to curve downward upon his own bare head.

Simultaneously, he was drenched from behind by the arching column of oil from the vat behind him.

In twin, converging arches, Thomas was inundated and thoroughly soaked from head to toe with a whirling mixture of oil and tar.

He cleared his eyes with squeezing fingers. Elaine, holding in her laughter with effort, showed him the box.

Above the button it said:

BE AN EPICENTER!

Control that mysterious power. Exert the forces of hidden nature in your behalf!

PRESS HERE!

"He's found it," croaked Thomas. "He's found it!"

"And you're a mess."

"That I am," said Thomas shaking off some of the gluck that was trickling down his arm. "That I am."

"Don't you mind?"

"I have my own revenge. My own, particular means of revenge. I'm sorry, Elaine. I must now leave you. The engineer has had his fun—now, my sweet, he may have the compensating task of cleaning up!"

Thomas turned and found the little tungsten box with its label: BE AN ENGINEER! and pressed the button.

Tom Lionel, Consulting Engineer, removed his finger from the button, and turned to see Elaine.

"Was it funny?" he asked.

"Very much so," she laughed.

"Who pushed it?"

"I did."

"Too bad. I'd rather he got it by his own machinations."

"He tried to stop me—"

"Uh-huh. Maybe it's better the

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way it is," Tom laughed in spite of the load of uncomfort he was carrying. He wiped some of the oil and tar mixture from his face and continued. "The instantaneous feeling of horror at the idea of seeing you glucked over with this mess must have given him some shock. No doubt he thought that whatever would happen would happen to the holder of the epicenter locator."

"Now what are you going to do?"

"Me?"

"Yes. You're going to clean up, aren't you?"

"Not me."

"How are you going to . . . to—?"

"Cause his return?"

"Yes."

Tom considered. "I guess I'm licked. He'll just use this box of his."

"Can't you undo it?"

"Nope. It's just too tough. I'd go to work on the insides with acid if I could get inside of it. The outside is possible, but I haven't enough acid to react with the whole darned box. But I'm going to get something. Well, I'm going inside and take myself a shower. Wait—I'll be back."

An hour later, Tom Lionel emerged from the bathroom. Frank, the houseboy went in with a humorous shake of the head. He'd seen the embryonic mess and knew what there was to do.

"Now what?" asked Elaine.

"Well, you see, the thing is slightly out of hand," exclaimed Tom. "I started this thing because my physicist friend got out of line

and shot the entire bankroll on a pile of scientific flapdoodle." He took a cigarette case from his pocket that glinted and iridesced as he opened it. "I've been able to use nearly everything," he grinned, "including the ruling engine," he waved the grating-ruled cigarette case at the girl. "Marten shelled out about ten thousand bucks for the secret of the finish on this case. He's ruling jewelry now and it is the largest thing since the discovery of diamond-faceting. I'm also getting a five percent royalty on every grating-ruled piece that's made. It ain't hay.

"Anyway, it backfired on me because I presented him with something that offered him, not frustration, but instead, he proceeded to make something of it that no sensible engineer could ignore. And," he continued ruefully, "it did two more drastic things. One, it made his continued influence necessary. There are too many things that he knows to dispense with his type of thinking. Number two, my success in reducing his discoveries to practice has resulted in the generation of a good income. That has been the basis of our argument. He's impractical to the extreme, but as long as the body is fed, both materially and intellectually, so what? So instead of finding myself the winner, I'm actually fighting for my own existence." Tom went bitter. "A fine thing. To be forced to fight for one's existence because of factors that emanate from his own success."

Elaine put a hand on his shoulder.



"Don't be bitter," she said softly. "I . . . I'll miss you—"

"Oh, don't worry," he told her in a strained voice. "I don't intend to give up." He cradled her face between his hands and looked her straight in the eyes. "If, as, and when, I—though the concept is purely hypothetical—might possibly lose—mind, I have no intention of losing since I intend to win unconditionally and maintaining the present status is intolerable—the other guy will have been in such a mad battle that he'll be forced into accepting some practical tenets as a factor. Then he'll be more like me."

"This may hurt," she said seriously, "but you are not as different as you might think."

"He hates the thought of practicality."

"And yet," said Elaine, "if all were engineers who would take time to seek out the little-known facts?"

"And," snorted Tom, "if all were physicists, we would still be hanging from trees, tossing coconuts at one another whilst a few bright dawn-men were contemplating the possibilities of using fire—but, of course, doing nothing about it. After all, once the physicist has considered all the angles, he's through. He doesn't give a howling hoot whether what he's considered is practical—after all, it is interesting and that's all he cares about."

"But—"

"Since the physicist's thinking is actually based upon past proof—made by practical engineers—the

contemplation of fire would be as far as they'd get. For there would be no engineer to ever use it to show its practical possibilities! That's based on my horribly hypothetical world where all were physicists and none were engineers."

"Who invented the bow and arrow?" asked Elaine.

"Ab, Ug, or Unguh. He, she, or it was an experimenter. Y'see, Elaine, at one time there were neither engineers nor physicists. Alexander Graham Bell was not—in our present day sense—a physicist nor was Morse, or Edison or Lodge. Nor were they engineers. Somewhere since then the line has been divided. In them days they were basement geniuses. But now," he said bitterly, "There is one set of people who think up cockeyed things and another set that figures out what to do with them."

"Y'know," smiled Elaine, "I think that getting together would be the finest thing that ever happened to you and the physicist."

Tom backed up three steps. "Look," he snapped, "I've heard a lot. I can stand for a lot. But that's something that I can't even consider."

"Both of you offer so much to—"

"Yeah," he sneered, "and we're both solid citizens! Hooey."

Tom stalked over to the chessboard and looked down. "Overconfidence is a dangerous thing," he said with a smile. He moved a bishop halfway across the board. "There," he said with a satisfied air, "that should be obscure enough

to fool anybody, even Lasker."

"Who's Lasker?" asked the girl.

"One of the chess masters."

"Oh."

"Now," he said, "I'm going to ask you a favor."

"Yes."

He grinned. "It might be quite personal."

"In which case I'd ask you a favor, too."

"What kind?"

"That depends on the nature of the original request. What's yours?"

"I'd like you to write a few letters for me."

"In which case there'll be no counterproposition."

For three solid hours, Elaine sat at the typewriter. At the end of that time, Tom smiled, patted her on the top of the head and said: "You've been a good girl, kiddo."

"Thanks," she mumbled. "But there are things about your physicist that I do admire. He never makes his women work."

"Impractical lad," laughed Tom.

"Impractical, but fun."

"Bah. You, too, huh?"

"Well fun is—"

"Impractical."

"When you find time to be impractical," said Elaine, rising, "you may invite me over long enough to find out just exactly how practical an impractical batch of fun can be. Practically, I am an impractical asset with indispensable attributes." She arched one eyebrow at him and leered in a ladylike fashion. "You'll find out," she told him.

"Dinner?" he suggested.

"That I cook? Ah-ahhh." She touched his cheek lightly and then said: "I gotta go. I'm late as it is. Sorry, Tommy. But that's how it stands. Take it easy—and I'll be seein' you."

Tom Lionel, Consulting Engineer, saw her away, and then returned to his desk full of work. He sorted papers, did some computations, manipulated some theory, and then sat still, thinking out his plan.

His evening was full. He experimented in the laboratory until the wee small hours, and then spent another two hours contemplating, with relish, the results. He finished by writing another letter, taking a last look at the chessboard, and then retired with a final look at the calendar.

Thomas Lionel, Ph.D., M.M., awoke with a feeling of self-satisfaction. The world was his onion and he knew it. There was nothing to detract from his success. After all, every time he returned it was because the engineer had been frustrated. The same thing had happened again.

He breakfasted lazily, reading the mail and the notes made by the engineer. The notes satisfied him. He added some notations and made some calculations himself that would further frustrate the engineer when again possession of the body changed minds. He noted with relish that the bank account was growing by leaps and bounds—a backfired result of the engineer's own machinations.

How long it would be before the

engineer was completely vanished he did not know, but it would not be too long.

A few more developments of the poltergeist effect, another series of new sciences—with their attendant publicity, sales, and, of course, royalty and licensing fees—and the engineer would find nothing in his life worth living for. He then would turn, bending his naturally curious mind to the more obscure realm of physics.

In other words, the mind of Tom Lionel would become congruent with the mind of Thomas Lionel. Tom Lionel would vanish. Thomas Lionel, the ultimate desire of the engineer's mind would take control and the period of schizophrenia would end.

It was more than just logical. The consulting engineer wanted to be a physicist. Now that all barriers were removed, he would.

The hearty dislike of physicists that characterized the mind of the engineer was sheer jealousy; psychological block; that factor of the mind which, when denied a desire, hates all others who successfully achieve it.

Aesop called it "Sour Grapes."

He noted the calendar for the day. He nodded. He was to see a group of physicists from one of the government bureaus. That would be O.K. Later in the afternoon there was a conference between a group of production superintendents who were about to start producing items using the poltergeist effect. He made a notation to investigate the epicenter effect

and see what could be generated out of it.

The latter was interesting, and presented a problem.

He arose from the breakfast table and sought the chessboard. He laughed quietly and advanced a knight to cover his opponent's bishop. That was in accordance with a well-known theory of chess. If, after several moves, no apparent pattern is manifest, attack with a minor piece—or even capture or exchange minor pieces. The plan of attack may be obscure to you, but the chances are that a bold counterattack or exchange of minor pieces will disrupt the attack.

Well, all was well.

His plans? They were simple enough. He would carry on. He would do more research, and confound the engineer whenever next he returned. It was as simple as that.

"The poltergeist effect," said Thomas, facing the group of government physicists, "is still in the field of research and development—and wide open on all sides. Much is still unknown about it, in spite of the fact," he added distastefully, "that certain aspects of it have already been put to work.

"You are all familiar with the initial theories, though I shall touch upon them briefly here again. The spatial strains, when under the influence of solar gravity, lunar gravity, and terrestrial gravity all in proper vectorial relationship, add to the spatial strains caused by the magnetic fields of the three main

bodies mentioned. The electrostatic fields in the terrestrial atmosphere—the same which cause lightning in another manifestation—also add to the spatial strain. These are all natural phenomena.

"The radiation of a thinking brain, gentlemen, is not a natural phenomena—not a natural characteristic warp in space," he corrected with a slight smile. "It causes a vibration in the region of the end-hysteresis loop of space itself when space is saturated to that threshold by the natural warps and strains. It exerts a triggering action that releases a more powerful nonphysical radiation, which in turn releases the space strain that causes—things—to move. Also this final buckling of the space strain releases a component of the initial wave which again exerts the triggering action. The proposition is self-sustaining as long as the gravitic, magnetic, and electrostatic effects are such as to maintain the saturation of space at the hysteresis-loop level.

"However," continued Thomas, "it has been discovered that these potentials are not only released, but are dirigible, under the complex force-fields generated by the equipment so far developed. Some effects are akin to gravitic effects—the real nature of which none of us can state, or even guess."

"Your statements border on the fantastic," smiled the head visitor, Lowell Johnstown. "Were it not for the fact that your statements have been accompanied by experimental proof, we would be forced

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to discount them as the ravings of an insane mind. However, your paper before the American Physical Society plus your experimental data—which we all have duplicated—gives proof. The nullification of gravity—”

“Not nullification,” insisted Thomas. “I do not claim nullification. The effect is a development of diagravitic force.”

“The difference—?”

“Does exist. The generation of a counter-force may, in some cases be considered nullification. But nullification does not describe all aspects of counter-force. I prefer to use the counter-force definition, since vectorial components may be generated in the object under observation. These forces have no relation to the force of gravity acting upon the object, other than can be similarly observed in the free flight of a projectile, where both the forward motion and the gravitic attraction cause summation of forces into a parabolic path.”

“I'll accept your remarks. But we are here to discuss the epicenter effect.”

“The epicenter is a generator of the radiation which causes release of the potentials indigenous to all material bodies. This radiation is of a complex nature. It requires both physical, electrostatic, electromagnetic generators to produce the radiation that triggers the poltergeist potential.

“Incidentally, gentlemen, this may be why some people always seem to be getting into accidents. I be-

lieve that we have the true answer to the ‘Accident-Prone’ within our grasp.”

“How does this manifest in experimental work?” asked Johnstown.

“By crystallographic generation of the force-fields coupled with the radiation of the brain in question. The effect is probably more pronounced with a man whose prevalence toward poltergeist effects and accident prone-ness is higher than normal. I am seeking such a man now. By further filtering through crystals the random release of poltergeist energy is directed and controlled so that a desired object may be moved almost at will.”

“This equipment—can we hope to get it in practical size?”

Thomas considered and then said with a touch of disinterest: “It is possible. No doubt the practical viewpoint will appeal to many.”

“To sum up your statements,” interjected Johnstown, “we have an effect that will cause the movement of any desired object by the use of nonmaterial supporting and actuating means.”

“Right. And one other interesting effect. The generation of direct current electricity is also possible in the same manner. I might even add,” he concluded with a smile, “that manifestation of any physical effect is possible.”

Johnstown packed the pages of data in his briefcase. “You have unlocked a veritable universe of basic study,” he said. “You should feel gratified. We'll keep in touch

with you, Lionel. And, we'll return once we have had a chance to digest this information. Also, we'll furnish you with whatever observations we make."

Thomas watched them leave. He smiled. Adding to the discomfiture of the engineer at really having nothing left to work for—the bank account being filled daily—he was tossing his discoveries to the world of physicists, and other engineers and scientists would take over, more than likely leaving the engineer foundering in a sea of uncertainty.

The group of production superintendents entered and seated themselves. Their spokesman, Charles Norden said: "We are here because of certain difficulties we are having in making your effect operate satisfactorily."

"I can, of course, assist you," smiled Thomas, affably.

"Good," answered Norden. "Here is the first difficulty." He pulled from his case a sheaf of blueprints, and he spread them out across the desk. "Our design department claims that the arrangement of knobs on the panel is inconvenient. A suggested change is to put them like this."

Franklen, who was one of Norden's associates objected: "That means you'll have to shunt the snivvy over here. That lengthens the leads and cause instability."

"But we can reinstate the stability by running the leads through a dingink."

"That won't help. Shielding the

leads only adds distributed capacity."

"It works. Only one percent loss in efficiency and better stability, believe it or not."

"Well," said Norden, "I'll leave it up to Lionel, here. What do you think?"

"I'll have to consider it," answered Lionel.

"You understand that it is important," urgd Norden.

"But why?"

"Why?" exploded Norden. "Great Scott! Look Lionel, the arrangements of these knobs are such that the operator must cross the calibration-scale with his hand while adjusting the output. That means that he must either assume a cramped position or he must adjust, observe, adjust, observe, and so on, taking the adjustment of output by increments instead of a stepless arrival at the precise value."

"Um."

"Look, Lionel, we aren't toying with the job of lifting a standard weight. We are hoisting three hundred tons of semirigid structure that mustn't be joggled too much."

"I see. Well under the circumstances I'll take quick action and give you the answer within twenty-four hours."

"We can't have it immediately?"

"I'm afraid not. I must make some tests before I can pass judgment on the matter."

"We are more or less forced to accept your time-limit," said Norden glumly. "Please understand that time is essential because every

minute that our production line is down costs the company about twenty dollars."

"I'll get your answer in twenty-four hours," Thomas faced another man. "And your trouble?"

He was Mawson, of Technical Manufacturing, Inc.

"You specify this part," indicating another set of blueprints, "as pure copper. Anything else do?"

"It carries high frequency. Copper is best—unless you could get silver. If that is—"

"Look we're making production and hope to hit fifteen thousand completed assemblies per day. That piece would weigh about two pounds. Silver is out."

"What's the matter with copper?" asked Lionel.

"It cuts like cheddar cheese, gums up the tools, and is generally not good for close tolerance work."

"The first one was all right."

"Listen," said Mawson, "you carved the first one out by hand and I'll bet it took you four or five hours. We're going to run 'em on an automatic screw machine at the rate of ten per minute."

"So?"

"I want to use free cutting brass."

"You'll lose conductivity—"

"The rig will be only seven percent less efficient. Tests—"

"Your tests may be right. But seven percent loss is pretty bad," grumbled Thomas. "I'd say no."

"Then I'm going to ask you to name a substitute. What alloy would suffice? I want a free cut-

ting alloy that'll come off of the tools clean."

Will White spoke up at this point. "We've got a bit of regeneration in our driver system," he said.

"That's easy. Have one of your engineers remove it."

"Can't. Anything they do to remove regeneration also destroys the driver's efficiency."

"Efficiency," said Thomas, "is the inverse function of the frequency of drive divided by the number of full-phase poles in the genedyne. Expressed by the quadratic equation in which A equals the number of full-phase poles—"

"But we can't get rid of the regeneration!" exploded White.

"Look, that driver is as simple as ABC. It has and will be a standard assembly for seven generations past and forward. Now don't tell me—"

"I'm telling you that we're burning up our test stands left and right. How long can you take a forty percent regeneration in a hundred kilowatt genedyne?"

"Well, not long," admitted Thomas. "You understand the principles involved?"

"Not entirely."

"I'll explain. The force-fields created by the full-phase poles under the power output from the driver create a nonelectromagnetic field radiation. The intensity of this field is a function of the driver output, derived tertiarily through the pole system. Now the development of the field radiation creates a space hysteresis that—"



"Look," snapped White, "I don't give a care about field theory. It doesn't apply in my job. I merely want to know what to do about the regeneration."

"How can you work without understanding the theory?" asked

Thomas with a sneer.

"How can a musician play a pipe organ without a course in first year physics?" shouted White. "Just tell me what to do!"

"Tell 'em to retune the driver to another band."

"They aren't certain that the pick-up loop is itself tuned or not."

"It is."

"Then that means tuning the entire feeder line."

"Naturally."

"But the feeder line is a silver plated die casting."

"Change the dies," said Thomas.

"May we charge you for them?" asked White, sweetly. "And also for scrapping the three hundred and seventy thousand parts we have cast already?"

"Why get so far ahead?"

"Look, Thomas Lionel, we did it because it was cheaper not to tie up the die-caster's shop in weekly dribbles rather than get the whole order in a lump. Now—what do we do about regeneration?"

"Anybody can clear up regeneration," snapped Lionel.

"Good—you show us how. That's what we're retaining you for. Your developments and whatever technical assistance is required."

Thomas Lionel looked up, and scanned each face at the big table. "From left to right, can you state your problems?" he asked.

"Plating specs on the genedyne."

"Problem in suspension during process."

"Can plus or minus fifteen percent electrical components be used in place of ten percents?"

"We still require the alignment procedure."

Thomas held up a hand. "O.K., fellows. Submit your problems in

writing and I'll furnish the answers in twenty-four hours."

Norden bobbed his head in agreement. "I fear that I shall call for cancellation of contract and the forfeit sum if your answers are not forthcoming."

Thomas nodded silently. The forfeit—if this whole gang bopped their contracts back he'd lose his shirt.

He watched them file out. And his eyes dropped from their stare out of the window to the pile of questions on the desk. A pile of production problems!

Sheer, unadulterated hell.

Well, he might as well call the engineer and let him handle this. It was one of the things that the engineer got a kick out of. As a physicist, this was not his job—and as an intelligent physicist, he did know how to get things done. Everything for its own use; if he didn't know, he knew where to find out.

Thomas went out to the laboratory and faced his tungsten box. A twinge of wonder flashed through his mind. It bothered him.

Was this an admission of partial defeat?

Not at all. This was good sense. Call in the engineer to clear up this mess, since his income and well-being depended upon it. Once these contracts were clear and closed—well, time enough!

He pressed the button.

And Thomas Lionel, Ph.D., M.M., pressed it again.

And again--

And again.

And then took a suspicious glance at the oxy-hydrogen torch on the table. A growing fear hit him. Tungsten wouldn't budge under an acetylene torch. Acids were not too effective, and plain, old-fashioned cutting tools were sheer foolishness. But heat the block white hot and hit it with an oxygen lance—

Thomas looked on the back side.

Uh-huh. The engineer had enjoyed himself. The back side of his little tungsten wave generator had been poked full of ragged holes; cut in ribbons with the oxygen lance, and generally made messy. The wave-guides and channels were all un-terminated and laid open. Pushing the button wouldn't do a thing.

It definitely would not call the engineer.

He had twenty-four hours to solve the production people's problems.

And Thomas Lionel understood. The engineer had his own little trap. No doubt the engineer would go fishing if called, and only the physicist was really interested in fighting this thing out to the bitter end. The engineer, losing already, had only a bank account to throw away by not working. And the engineer could get another one soon enough if permitted to do so.

Twenty-four hours.

Thomas headed in toward the house to get his notebook and his engineering notes. He'd have to

take over the engineer's job, no matter how distasteful.

Out of one corner of his eye he saw the chessboard and he stopped short. It had been the odd angle that gave the trap away but his moving of the knight had opened a line right down into his own defenses. On the next move there would be a severe attack against his queen, and in saving that, he'd lose the bishop. If he sacrificed the queen, he was as good as lost. In fact, it was checkmate no matter how long he fought; no matter what he did, it was only a question of three moves minimum or seven moves maximum.

Well, might as well give up. This game was gone and there was no use in fighting a losing battle—whipping a dead cat—

He opened the drawer and removed the little sign normally used to terminate a game without going through the formality of a checkmate.

But the sign had been augmented. It read:



THE END.

The Mule

(Continued from page 97)

free, and I choose to exercise our old friendship, if you will let me."

Toran's face was a twisted suppression of fury, "How did you find us? You were in the Filian ship, then? You followed us?"

The wooden lack of expression on Pritch's face might have flickered in embarrassment, "I was on the Filian ship! I met you in the first place . . . well . . . by chance."

"It is a chance that is mathematically impossible."

"No. Simply rather improbable, so my statement will have to stand. In any case, you admitted to the Filians—there is, of course, no such nation as Fili actually—that you were heading for the Trantor sector, and since the Mule already has his contacts upon Neotranstor, it was easy to have you detained there. Unfortunately, you got away before I arrived, but not long before. I had time to have the farms on Trantor ordered to report your arrival. It was done and I am here. May I sit down? I come in friendliness, believe me."

He sat. Toran bent his head and thought futilely. With a numbed lack of emotion, Bayta prepared tea.

Toran looked up harshly, "Well, what are you waiting for—colonel? What's your friendship? If it's not arrest, what is it then? Protective custody? Call in your men and give your orders."

Patiently, Pritch shook his

head, "No, Toran. I come of my own will to speak to you, to persuade you of the uselessness of what you are doing. If I fail I shall leave. That is all."

"That is all? Well, then peddle your propaganda, give us your speech, and leave. I don't want any tea, Bayta."

Pritch accepted a cup, with a grave word of thanks. He looked at Toran with a clear strength as he sipped lightly. Then he said, "The Mule is a mutant. He cannot be beaten in the very nature of the mutation—"

"Why? What is the mutation?" asked Toran, with sour humor. "I suppose you'll tell us now, eh?"

"Yes, I will. Your knowledge won't hurt him. You see—he is capable of adjusting the emotional balance of human beings. It sounds like a little trick, but it's quite unbeatable."

Bayta broke in, "The emotional balance?" She frowned, "Won't you explain that? I don't quite understand."

"I mean that it is an easy matter for him to instill into a capable general, say, the emotion of utter loyalty to the Mule and complete belief in the Mule's victory. His generals are emotionally controlled. They cannot betray him; they cannot weaken—and the control is permanent. His most capable enemies become his most faithful subordinates. The warlord of Kalgan surrenders his planet and becomes his viceroy for the Foundation."

"And you," added Bayta, bitterly.

"betray your cause and become Mule's envoy to Trantor. I see!"

"I haven't finished. The Mule's gift works in reverse even more effectively. Despair is an emotion! At the crucial moment, keymen on the Foundation; keymen on Haven despaired. Their worlds fell without too much struggle."

"Do you mean to say," demanded Bayta, tensely, "that the feeling I had in the Time Vault was the Mule juggling my emotional control."

"Mine, too. Everyone's. How was it on Haven towards the end?"

Bayta turned away.

Colonel Pritchett continued earnestly, "As it works for worlds, so it works for individuals. Can you fight a force which can make you surrender willingly when it so desires; can make you a faithful servant when it so desires?"

Toran said slowly "How do I know this is the truth?"

"Can you explain the fall of the Foundation and of Haven otherwise? Can you explain—my conversion otherwise? Think, man! What have you—or I—or the whole Galaxy accomplished against the Mule in all this time? What one little thing?"

Toran felt the challenge, "By the Galaxy, I can!" With a sudden touch of fierce satisfaction, he shouted, "Your wonderful Mule had contacts with Neotrantor you say that were to have detained us, eh? Those contacts are dead or worse. We killed the crown prince and left the other a whimpering idiot. The Mule did not stop us

there, and so much has been undone."

"Why, no, not at all. Those weren't our men. The crown prince was a wine-soaked mediocrity. The other man, Commason, is phenomenally stupid. He was a power on his world but that didn't prevent him from being vicious, evil, and completely incompetent. We had nothing really to do with them. They were, in a sense, merely feints—"

"It was they who detained us, or tried."

"Again, no. Commason had a personal slave—a man called Inchnay. Detention was *his* policy. He is old, but will serve our temporary purpose. You would not have killed *him*, you see."

Bayta whirled on him. She had not touched her own tea, "But, by your very statement, your own emotions have been tampered with. You've got faith and belief in the Mule, an unnatural, a *diseased* faith in the Mule. Of what value are your opinions? You've lost all power of objective thought."

"You are wrong." Slowly, the colonel shook his head. "Only my emotions are fixed. My reason is as it always was. It may be influenced in a certain direction by my conditioned emotions, but it is not *forced*. And there are some things I can see more clearly, now that I am freed of my earlier emotional trend.

"I can see that the Mule's program is an intelligent and worthy one. In the time since I have been—converted, I have followed his

career from its start seven years ago. With his mutant mental power, he began by winning over a condottiere and his band. With that—and his power—he won a planet. With that—and his power—he extended his grip until he could tackle the warlord of Kalgan. Each step followed the other logically. With Kalgan in his pocket, he had a first-class fleet, and with that—and his power—he could attack the Foundation.

"The Foundation is the key. It is the greatest area of industrial concentration in the Galaxy, and now that the atomic techniques of the Foundation are in his hands, he is the actual master of the Galaxy. With those techniques—and his power—he can force the remnants of the Empire to acknowledge his rule, and eventually—with the death of the old emperor, who is mad and not long for this world—to crown him emperor. He will then have the name as well as the fact. With that—and his power—where is the world in the Galaxy that can oppose him?

"In these last seven years, he has established a new Empire. In seven years, in other words, he will have accomplished what all Seldon's psychohistory could not have done in less than an additional seven hundred. The Galaxy will have peace and order at last.

"And you could not stop it—any more than you could stop a planet's rush with your shoulders."

A long silence followed Pritch-
er's speech. What remained of

his tea had grown cold. He emptied his cup, filled it again, and drained it slowly. Toran bit viciously at a thumbnail. Bayta's face was cold, and distant, and white.

Then, Bayta said in a thin voice, "We are not convinced. If the Mule wishes us to be, let him come here and condition us himself. You fought him until the last moment of your conversion, I imagine, didn't you?"

"I did," said Colonel Pritch-
er, solemnly.

"Then allow us the same privi-
lege."

Colonel Pritch-er arose. With a crisp air of finality, he said, "Then I leave. As I said earlier, my mis-
sion at present concerns you in no way. Therefore, I don't think it will be necessary to report your presence here. That is not too great a kindness. If the Mule wishes you stopped, he no doubt has other men assigned to the job, and you will be stopped. But, for what it is worth, I shall not contribute more than my requirement."

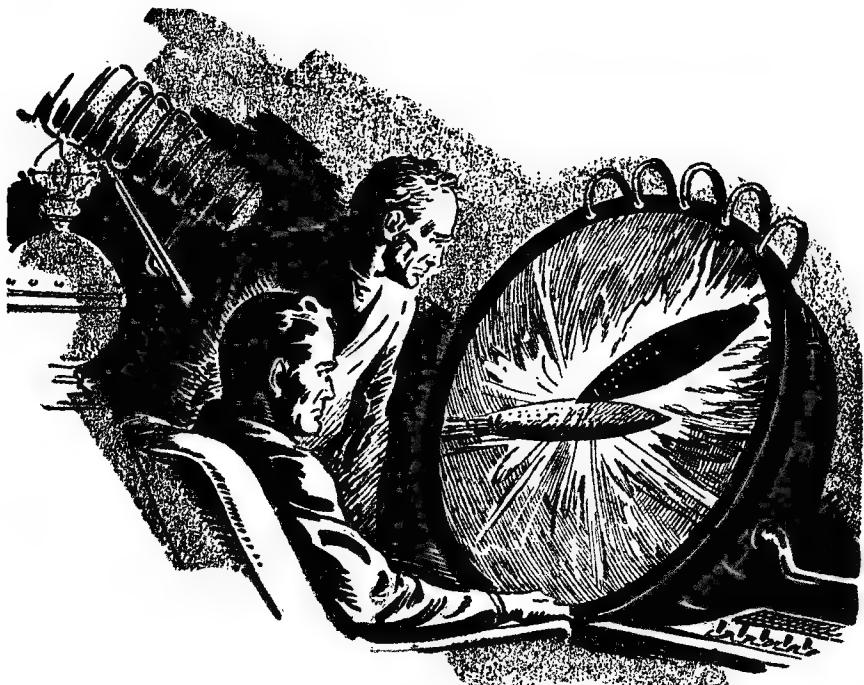
"Thank you," said Bayta faintly.

"As for Magnifico. Where is he? Come out, Magnifico, I won't hurt you—"

"What about him?" demanded Bayta, with sudden animation.

"Nothing. My instructions make no mention of him, either. I have heard that he is searched for, but the Mule will find him when the time suits him. I shall say nothing. Will you shake hands?"

Bayta shook her head. Toran glared his frustrated contempt.



There was the slightest lowering of the colonel's iron shoulders. He strode to the door, turned and said:

"One last thing. Don't think I am not aware of the source of your stubbornness. It is known that you search for the Second Foundation. The Mule, in his time, will take his measures. Nothing will help you—But I knew you in other times; perhaps there is something in my conscience that urged me to this; at any rate, I tried to help you and remove you from the final danger before it was too late. Good by."

He saluted sharply—and was gone.

Bayta turned to a silent Toran, and whispered, "They even know about the Second Foundation."

In the recesses of the library, Ebling Mis, unaware of all, crouched under the one spark of light amid the murky spaces, and mumbled triumphantly to himself.

XV.

After that there were only two weeks left to the life of Ebling Mis.

And in those two weeks, Bayta was with him three times. The first time was on the night after the evening upon which they saw Colonel Pritch. The second was one week later. And the third was again a week later—on the last day—the day Mis died.

First, there was the night of Colonel Pritch's evening, the first

hour of which was spent by a stricken pair in a brooding, unmerry merry-go-round.

Bayta said, "Torie, let's tell Ebling."

Toran said dully, "Think he can help?"

"We're only two. We've got to take some of the weight off. Maybe he *can* help."

Toran said, "He's changed. He's lost weight. He's a little feathery; a little woolly." His fingers groped in air, metaphorically. "Sometimes, I don't think he'll help us much—ever. Sometimes, I don't think anything will help."

"Don't!" Bayta's voice caught and escaped a break, "Torie, don't! When you say that, I think the Mule's getting us. Let's tell Ebling, Torie—now!"

Ebling Mis raised his head from the long desk, and blearied at them as they approached. His thinning hair was scuffed up, his lips made sleepy, smacking sounds.

"Eh?" he said, "Someone want me?"

Bayta bent to her knees, "Did we wake you? Shall we leave?"

"Leave? Who is it? Bayta? No, no, stay! Aren't there chairs? I saw them—" His finger pointed vaguely.

Toran pushed two ahead of him. Bayta sat down and took one of the psychologist's flaccid hands in hers, "May we talk to you, doctor?" She rarely used the title.

"Is something wrong?" A little sparkle returned to his abstracted eyes. His sagging cheeks regained

a touch of color. "Is something wrong?"

Bayta said, "Captain Pritchler has been here. Let *me* talk. Torie. You remember Captain Pritchler, doctor?"

"Yes— Yes—" His fingers pinched his lips and released them. "Tall man. Democrat."

"Yes, he. He's discovered the Mule's mutation. He was here, doctor, and told us."

"But that is nothing new. The Mule's mutation is straightened out." In honest astonishment, "Haven't I told you? Have I forgotten to tell you?"

"Forgotten to tell us what?" put in Toran, quickly.

"About the Mule's mutation, of course. He tampers with emotions. Emotional control! I haven't told you? Now what made me forget?" Slowly, he sucked in his under lip and considered.

Then, slowly, life crept into his voice and his eyelids lifted wide, as though his sluggish brain had slid onto a well-greased single track. He spoke in a dream, looking between the two listeners rather than at them, "It is really so simple. It requires no specialized knowledge. In the mathematics of psychohistory, of course, it works out promptly, in a third-level equation involving no more— Never mind that. It can be put into ordinary words—roughly—and have it make sense, which isn't usual with psychohistorical phenomena.

"Ask yourselves— What can upset Hari Seldon's careful scheme of history, eh?" He peered from

one to the other with a mild, questioning anxiety, "What were Seldon's original assumptions? First, that there would be no fundamental change in human society over the next thousand years.

"For instance, suppose there were a major change in the Galaxy's technology, such as finding a new principle for the utilization of energy, or perfecting the study of electronic neurobiology. Social changes would render Seldon's original equations obsolete. But that hasn't happened, has it now?

"Or suppose that a new weapon were to be invented by forces outside the Foundation, capable of withstanding all the Foundation's armaments. *That* might cause a ruinous deviation, though less certainly. But even that hasn't happened. The Mule's Atomic Field-Depressor was a clumsy weapon and could be countered. And that was the only novelty he presented, poor at it was.

"But there was a second assumption, a more subtle one! Seldon assumed that human reaction to stimuli would remain constant. Granted, that the first assumption held true, *then the second must have broken down!* Some factor must be twisting and distorting the emotional responses of human beings or Seldon couldn't have failed and the Foundation couldn't have fallen. And what factor but the Mule?

"Am I right? Is there a flaw in the reasoning?"

Bayta's plump hand patted his gently, "No flaw, Ebling."

Mis was joyful, like a child, "This and more comes so easily. I tell you I wonder sometimes what is going on inside me. I seem to recall a time when so much was a mystery to me and now things are so clear. Problems are absent. I come across what might be one, and somehow, inside me, I see and understand. And my guesses, my theories, seem always to be borne out. There's a drive in me . . . always onward . . . so that I can't stop . . . and I don't want to eat or sleep . . . but always go on . . . and on . . . and on—"

His voice was a whisper; his wasted, blue-veined hand rested tremblingly upon his forehead. There was a frenzy in his eyes that faded and went out.

He said more quietly, "Then I never told you about the Mule's mutant powers, did I? But then . . . did you say you knew about it?"

"It was Captain Pritchett, Ebling," said Bayta. "Remember?"

"He told you?" There was a tinge of outrage in his tone. "But how did he find out?"

"He's been conditioned by the Mule. He's a colonel now, a Mule's man. He came to advise us to surrender to the Mule, and he told us—what you told us."

"Then the Mule knows we're here? I must hurry— Where's Magnifico? Isn't he with you?"

"Magnifico's sleeping," said Toran, impatiently. "It's past midnight, you know."

"It is? Then— Was I sleeping when you came in?"

"You were," said Bayta decisively, "and you're not going back to work, either. You're getting into bed. Come on, Torie, help me. And you stop pushing at me, Ebling, because it's just your luck I don't shove you under a shower first. Pull off his shoes, Torie, and tomorrow you come down here and drag him out into the open air before he fades completely away. Look at you, Ebling, you'll be growing cobwebs. Are you hungry?"

Ebling Mis shook his head and looked up from his cot in a peevish confusion. "I want you to send Magnifico down tomorrow," he muttered.

Bayta tucked the sheet around his neck, "You'll have *me* down tomorrow, with washed clothes. You're going to take a good bath, and then get out and visit the farm and feel a little sun on you."

"I won't do it," said Mis weakly. "You hear me? I'm too busy."

His sparse hair spread out on the pillow like a silver fringe about his head. His voice was a confidential whisper, "You want that Second Foundation, don't you?"

Toran turned quickly and squatted down on the cot beside him, "What about the Second Foundation, Ebling?"

The psychologist freed an arm from beneath the sheet and his tired fingers clutched at Toran's sleeve, "The Foundations were established at a great Psychological Convention presided over by Hari Seldon. Toran, I have located the published minutes of that Convention. Twenty-five fat films. I have al-

ready looked through various summaries."

"Well?"

"Well, do you know that it is very easy to find from them the exact location of the First Foundation, if you know anything at all about psychohistory. It is frequently referred to, when you understand the equations. But Toran, nobody mentions the Second Foundation. There has been no reference to it anywhere?"

Toran's eyebrows pulled into a frown, "It doesn't exist?"

"Of course it exists," cried Mis, angrily, "who said it didn't? But there's less talk of it. Its significance—and all about it—are better hidden, better obscured. Don't you see? It's the more important of the two. It's the critical one; *the one that counts!* And I've got the minutes of the Seldon Convention. The Mule hasn't won yet—"

Quietly, Bayta turned the lights down, "Go to sleep!"

Without speaking, Toran and Bayta made their way up to their own quarters.

The next day, Ebling Mis bathed and dressed himself, saw the sun of Trantor and felt the wind of Trantor for the last time. At the end of the day he was once again submerged in the gigantic recesses of the library, and never emerged thereafter.

In the week that followed, life settled again into its groove. The sun of Neotrantor was a calm, bright star in Trantor's night sky. The farm was busy with its spring

planting. The University grounds were silent in their desertion. The Galaxy seemed empty. The Mule might never have existed.

Bayta was thinking that as she watched Toran light his cigar carefully and look up at the sections of blue sky visible between the swarming metal spires that encircled the horizon.

"It's a nice day," he said.

"Yes, it is. Have you everything I mentioned on the list, Torie?"

"Sure. Half pound butter, dozen eggs, string beans— Got it all down here, Bay. I'll have it right."

"Good. And make sure the vegetables are of the last harvest and not museum relics. Did you see Magnifico anywhere, by the way?"

"Not since breakfast. Guess he's down with Ebling, watching a book-film."

"All right. Don't waste any time, because I'll need the eggs for dinner."

Toran left with a backward smile and a wave of the hand.

Bayta turned away as Toran slid out of sight among the maze of metal. She hesitated before the kitchen door, about-faced slowly, and entered the colonnade leading to the elevator that burrowed down into the recesses.

Ebling Mis was there, head bent down over the eyepieces of the projector, motionless, a frozen, questing body. Near him sat Magnifico, screwed up into a chair, eyes sharp and watching—a bundle of slatty limbs with a nose emphasizing his scrawny face.

Bayta said softly, "Magnifico—" Magnifico scrambled to his feet. His voice was an eager whisper, "My lady!"

"Magnifico," said Bayta, "Toran has left for the farm and won't be back for a while. Would you be a good boy and go out after him with a message that I'll write for you?"

"Gladly, my lady. My small services are but too eagerly yours, for the tiny uses you can put them to."

She was alone with Ebling Mis, who had not moved. Firmly, she placed her hand upon his shoulder, "Ebling—"

The psychologist started, with a peevish cry, "What is it?" He wrinkled his eyes, "Is it you, Bayta? Where's Magnifico?"

"I sent him away. I want to be alone with you for a while." She enunciated her words with exaggerated distinctness, "I want to talk to you, Ebling."

The psychologist made a move to return to his projector, but her hand on his shoulder was firm. She felt the bone under the sleeve clearly. The flesh seemed to have fairly melted away since their arrival on Trantor. His face was thin, yellowish, and bore a half-week stubble. His shoulders were visibly stooped, even in a sitting position.

Bayta said, "Magnifico isn't bothering you, is he, Ebling? He seems to be down here night and day."

"No, no, no! Not at all. Why, I don't mind him. He is silent and never disturbs me. Sometimes he

carries the films back and forth for me; seems to know what I want without my speaking. Just let him be."

"Very well—but, Ebling, doesn't he make you wonder? Do you hear me, Ebling? Doesn't he make you wonder?"

She jerked a chair close to his and stared at him as though to pull the answer out of his eyes.

Ebling Mis shook his head, "No. What do you mean?"

"I mean that Colonel Pritchett and you both say the Mule can condition the emotions of human beings. But are you sure of it? Isn't Magnifico himself a flaw in the theory?"

There was silence.

Bayta repressed a strong desire to shake the psychologist, "What's *wrong* with you, Ebling? Magnifico was the Mule's clown. Why wasn't he conditioned to love and faith? Why should he, of all those in contact with the Mule, hate him so."

"But . . . but he *was* conditioned. Certainly, Bay!" He seemed to gather certainty as he spoke. "Do you suppose that the Mule treats his clown the way he treats his generals? He needs faith and loyalty in the latter, but in his clown he needs only fear. Didn't you ever notice that Magnifico's continual state of panic is pathological in nature? Do you suppose it is natural for a human being to be as frightened as that all the time? Fear to such an extent becomes comic. It was probably comic to the Mule

—and helpful, too, since it obscured what help we might have gotten earlier from Magnifico."

Bayta said, "You mean Magnifico's information about the Mule was false?"

"It was misleading. It was colored by pathological fear. The Mule is not the physical giant Magnifico thinks. He is more probably an ordinary man outside his mental powers. But if it amused him to appear a superman to poor Magnifico—" The psychologist shrugged. "In any case, Magnifico's information is no longer of importance."

"What is, then?"

But Mis shook himself loose and returned to his projector.

"What is, then?" she repeated. "The Second Foundation?"

The psychologist's eyes jerked towards her, "Have I told you anything about that? I don't remember telling you anything. I'm not ready yet. What have I told you?"

"Nothing," said Bayta, intensely. "Oh, Galaxy, you've told me nothing, but I wish you would because I'm deathly tired. When will it be over?"

Ebling Mis peered at her, vaguely rueful, "Well, now, my . . . my dear, I did not mean to hurt you. I forget sometimes . . . who my friends are. Sometimes it seems to me that I must not talk of all this. There's a need for secrecy—but from the Mule, not from you, my dear." He patted her shoulder with a weak amiability.

She said, "What about the Second Foundation?"

His voice was automatically a whisper, thin and sibilant, "Do you know the thoroughness with which Seldon covered his traces? The proceedings of the Seldon Convention would have been of no use to me at all as little as a month ago, before this strange insight came. Even now, it seems—tenuous. The papers put out by the Convention are often apparently unrelated; always obscure. More than once I wondered if the members of the Convention, themselves, knew all that was in Seldon's mind. Sometimes I think he used the Convention only as a gigantic front, and single-handed erected the structure—"

"Of the Foundations?" urged Bayta.

"Of the Second Foundation! *Our* Foundation was simple. But the Second Foundation was only a name. It was mentioned, but if there was any elaboration, it was hidden deep in the mathematics. There is still much I don't even begin to understand, but for seven days, the bits have been clumping together into a vague picture.

"Foundation Number One was a world of physical scientists. It represented a concentration of the dying science of the Galaxy under the conditions necessary to make it live again. No psychologists were included. It was a peculiar distortion, and must have had a purpose. The usual explanation was that Seldon's psychohistory worked best where the individual working units—human beings—had no knowledge of what was coming, and could

therefore react naturally to all situations. Do you follow me, my dear—"

"Yes, doctor."

"Then listen carefully. Foundation Number Two was a world of mental scientists. It was the mirror image of our world. Psychology, not physics, was king." Triumphant, "You see?"

"I don't."

"But think, Bayta, use your head. Ilari Seldon knew that his psychohistory could predict only probabilities, and not certainties. There was always a margin of error, and as time passed that margin increases in geometric progression. Seldon would naturally guard as well as he could against it. Our Foundation was scientifically vigorous. It could conquer armies and weapons. It could pit force against force. But what of the mental attack of a mutant such as the Mule?"

"That would be for the psychologists of the Second Foundation!" Bayta felt excitement rising within her.

"Yes, yes, yes! Certainly!"

"But they have done nothing so far."

"How do you know they haven't?"

Bayta considered that, "I don't. Do you have evidence that they are?"

"No. There are many factors I know nothing of. The Second Foundation could not have been established full-grown, any more than we were. We developed slowly and grew in strength; they must have also. The stars know at what

stage their strength is now. Are they strong enough to fight the Mule? Are they aware of the danger in the first place? Have they capable leaders?"

"But if they follow Seldon's plan, then the Mule *must* be beaten by the Second Foundation."

"Ah," and Ebling Mis' thin face wrinkled thoughtfully, "is it that again? But the Second Foundation was a more difficult job than the First. Its complexity is hugely greater; and consequently so is its possibility of error. And if the Second Foundation should not beat the Mule, it is bad—ultimately bad. It is the end, maybe, of the human race as we know it."

"No."

"Yes. If the Mule's descendants inherit his mental powers— You see? *Homo sapiens* could not compete. There would be a new dominant race—a new aristocracy—with *homo sapiens* demoted to slave labor as an inferior race. Isn't that so?"

"Yes, that is so."

"And even if by some chance, the Mule did not establish a dynasty, he would still establish a distorted new Empire upheld by his personal power only. It would die with his death; the Galaxy would be left where it was before he came, except that there would no longer be Foundations around which a real and healthy Second Empire could coalesce. It would mean thousands of years of barbarism. It would mean no end in sight."

"What can we do? Can we warn the Second Foundation?"

"We must, or they may go under

through ignorance, which we cannot risk. But there is no way of warning them."

"No way."

"I don't know where they are located. They are 'at the other end of the Galaxy' but that is all, and there are millions of worlds to choose from."

"But Ebling, don't they say?" She pointed vaguely at the films that covered the table.

"No, they don't. Not where I can find it—yet. The secrecy must mean something. There must be a reason—" A puzzled expression returned to his eyes, "But I wish you'd leave. I have wasted enough time, and it's growing short—it's growing short."

He tore away, petulant and frowning.

Magnifico's soft step approached. "Your husband is home, my lady."

Ebling Mis did not greet the clown. He was back at his projector.

That evening, Toran having listened, spoke, "And you think he's really right, Bay? You think he isn't—" He hesitated.

"He is right, Torie. He's sick, I know that. The change that's come over him, the loss in weight, the way he speaks—he's sick. But as soon as the subject of the Mule or the Second Foundation, or anything he is working on, comes up, listen to him. He is lucid and clear as the sky of outer space. He knows what he's talking about. I believe him."

"Then there's hope." It was half a question.

"I . . . I haven't worked it out. Maybe! Maybe not! I'm carrying a blaster from now on." The shiny-barreled weapon was in her hand as she spoke. "Just in case, Torie, just in case."

"In case what?"

Bayta laughed with a touch of hysteria, "Never mind. Maybe I'm a little crazy, too—like Ebling Mis."

Ebling Mis at that time had seven days to live, and the seven days slipped by, one after the other, quietly.

To Toran, there was a quality of stupor about them. The warming days and the dull silence covered him with lethargy. All life seemed to have lost its quality of action, and changed into an infinite sea of hibernation.

Mis was a hidden entity whose burrowing work produced nothing and did not make itself known. He had barricaded himself. Neither Toran nor Bayta could see him. Only Magnifico's go-between characteristics were evidence of his existence. Magnifico, grown silent and thoughtful, with his tiptoed trays of food, and his still, watchful witness in the gloom.

Bayta was more and more a creature of herself. The vivacity died, the self-assured competence wavered. She, too, sought her own, worried, absorbed company, and once Toran had come upon her, fingering her blaster. She had put it away quickly, forced a smile.



DOC SAVAGE RETIRES

Or does he?

It started with some counterfeit lecture tickets that were free, anyway—an exploding gasoline truck—a swathe of bandages that all but hid a face.

Then there was the private eye who was shipped off to Mexico . . .

What did it all add up to? Read MEASURES FOR A COFFIN in the January issue of

DOC SAVAGE AT ALL NEWSSTANDS

"What are you doing with it, Bay?"

"Holding it. Is that a crime?"

"You'll blow your fool head off."

"Then I'll blow it off. Small loss!"

Married life had taught Toran the futility of arguing with a female in a dark-brown mood. He shrugged, and left her.

On the last day, Magnifico scampered breathless into their presence. He clutched at them, frightened, "The learned doctor calls for you. He is not well."

And he wasn't well. He was in bed, his eyes unnaturally large, unnaturally bright. He was dirty, unrecognizable.

"Ebling!" cried Bayta.

"Let me speak," croaked the psychologist, lifting his weight to a thin elbow with an effort. "Let me speak. I am finished; the work I pass on to you. I have kept no notes; the scrap-figures I have destroyed. No other must know. All must remain in your minds."

"Magnifico," said Bayta, with rough directness. "Go upstairs!"

Reluctantly, the clown rose and took a backward step. His sad eyes were on Mis.

Mis gestured weakly, "He won't matter; let him stay. Stay, Magnifico."

The clown sat down quickly. Bayta gazed at the floor. Slowly, slowly, her lower lip caught in her teeth.

Mis said, in a hoarse whisper, "I am convinced the Second Foundation can win, if it is not caught prematurely by the Mule. It has

kept itself secret; the secrecy must be upheld; it has a purpose. You must go there; your information is vital . . . may make all the difference. Do you hear me?"

Toran cried in near-agony, "Yes, yes! Tell us how to get there. Ebling? Where is it?"

"I can tell you," said the faint voice.

He never did.

Bayta, face frozen white, lifted her blaster and shot, with an echoing clap of noise. From the waist upward, Mis was not, and a ragged hole was in the wall behind. From numb fingers, Bayta's blaster dropped to the floor.

XVI.

There was not a word to be said. The echoes of the blast rolled away into the outer rooms and rumbled downward into a hoarse, dying whisper. Before its death, it had muffled the sharp clamor of Bayta's falling blaster, smothered Magnifico's high-pitched cry, drowned out Toran's inarticulate roar.

There was a silence of agony. Bayta's head was bent into obscurity. A droplet caught the light as it fell. Bayta had never wept before.

Toran's muscles almost cracked in their spasm, but he did not relax—he felt as if he would never unclench his teeth again. Magnifico's face was a faded, lifeless mask.

Finally, from between teeth still tight, Toran choked out in an unrecognizable voice, "You're a Mule's woman, then. He got to you!"

Bayta looked up, and her mouth twisted with a painful merriment, "I, a Mule's woman? That's ironic."

She smiled—a brittle effort—and tossed her hair back. Slowly, her voice verged back to the normal, or something near it. "It's over, Toran; I can talk now. How much I will survive, I don't know. But I can start talking—"

Toran's tension had broken of its own weight and faded into a flaccid dullness, "Talk about what, Bay? What's there to talk about?"

"About the calamity that's followed us. We've remarked about it before, Torie. Don't you remember? How defeat has always bitten at our heels and never actually managed to nip us? We were on the Foundation, and it collapsed while the Independent Traders still fought—but we got out in time to go to Haven. We were on Haven, and it collapsed while the others still fought—and again we got out in time. We went to Neotrantor, and by now it's undoubtedly joined the Mule."

Toran listened and shook his head, "I don't understand."

"Torie, such things don't happen in real life. You and I are insignificant people; we don't fall from one vortex of politics into another continuously for the space of a year—unless we carry the vortex with us. *Unless we carry the source of infection with us!* Now do you see?"

Toran's lips tightened. His glance fixed horribly upon the bloody remnants of what had once been

a human, and his eyes sickened.

"Let's get out of here, Bay. Let's get out into the open."

It was cloudy outside. The wind scudded about them in drab spurts and disordered Bayta's hair. Magnifico had crept after them and now he hovered at the edge of their conversation.

Toran said tightly, "You killed Ebling Mis because you believed *him* to be the focus of infection?" Something in her eyes struck him. He whispered, "He was the Mule?" He did not—could not—believe the implications of his own words.

Bayta laughed sharply, "Poor Ebling the Mule? Galaxy, no! I couldn't have killed him if he were the Mule. He would have detected the emotion accompanying the move and changed it for me to love, devotion, adoration, terror, whatever he pleased. No, I killed Ebling because he was *not* the Mule. I killed him because he knew where the Second Foundation was, and in two seconds would have told the Mule the secret."

"Would have told the Mule the secret," Toran repeated stupidly. "Told the Mule—"

And then he emitted a sharp cry, and turned to stare in horror at the clown, who might have been crouching unconscious there for the apparent understanding he had of what he heard.

"Not Magnifico?" Toran whispered the question.

"Listen!" said Bayta. "Do you remember what happened on Neo-

trantor? Oh, think for yourself, Torie—"

But he shook his head and mumbled at her.

She went on, wearily, "A man died on Neotranstor. A man died with no one touching him. Isn't that true? Magnifico played on his Visi-Sonor and when he was finished, the crown prince was dead. Now isn't that strange? Isn't it queer that a creature afraid of everything, apparently helpless with terror, has the capacity to kill at will."

"The music and the light-effects," said Toran, "have a profound emotional effect—"

"Yes, an *emotional* effect. A pretty big one. Emotional effects happen to be the Mule's specialty. That, I suppose, can be considered

a coincidence. And a creature who can kill by suggestion is so full of fright. Well, the Mule tampered with his mind, supposedly, so that can be explained. But, Toran, I caught a little of that Visi-Sonor selection that killed the crown prince. Just a little—but it was enough to give me that same feeling of despair I had in the Time Vault and on Haven. Toran, I can't mistake that particular feeling."

Toran's face was darkening, "I . . . felt it, too. I forgot. I never thought—"

"It was then that it first occurred to me. It was just a vague feeling—intuition, if you like. I had nothing to go on. And then Pritchett told us of the Mule and his mutation, and it was clear in a moment. It was the Mule who had created



the despair in the Time Vault; it was Magnifico who had created the despair on Neotrantor. It was the same emotion. Therefore, the Mule and Magnifico were the same person. Doesn't it work out nicely, Torie? Isn't it just like an axiom in geometry—things equal to the same thing are equal to each other?"

She was at the edge of hysteria, but dragged herself back to sobriety by main force. She continued, "The discovery scared me to death. If Magnifico were the Mule, he could know my emotions—and cure them for his own purposes. I dared not let him know. I avoided him. Luckily, he avoided me also; he was too interested in Ebning Mis. I planned killing Mis before he could talk. I planned it secretly—as secretly as I could—so secretly I didn't dare tell it to myself. If I could have killed the Mule himself— But I couldn't take the chance. He would have noticed, and I would have lost everything."

She seemed drained of emotion.

Toran said harshly and with finality, "It's impossible. Look at the miserable creature. *He* the Mule? He doesn't even hear what we're saying."

But when his eyes followed his pointing finger, Magnifico was erect and alert, his eyes sharp and darkly bright. His voice was without a trace of an accent, "I hear her, my friend. It is merely that I have been sitting here and brooding on the fact that with all my cleverness and forethought, I could make a mistake, and lose so much."

Toran stumbled backward as if

afraid the clown might touch him or that his breath might contaminate him.

Magnifico nodded, and answered the unspoken question, "I am the Mule."

He seemed no longer a grotesque; his pipestem limbs, his beak of a nose lost their humor-compelling qualities. His fear was gone; his bearing was firm.

He was in command of the situation with an ease born of usage.

He said, tolerantly, "Seat yourselves. Go ahead; you might as well sprawl out and make yourselves comfortable. The game's over, and I'd like to tell you a story. It's a weakness of mine—I want people to understand me."

And his eyes as he looked at Bayta were still the old, soft sad brown ones of Magnifico, the clown.

"There is nothing really to my childhood," he began, plunging bodily into quick, impatient speech, "that I care to remember. Perhaps you can understand that. My meagerness is glandular; my nose I was born with. It was not possible for me to lead a normal childhood. My mother died before she saw me. I do not know my father. I grew up haphazard; wounded and tortured in mind, full of self-pity and hatred of others. I was known then as a queer child. All avoided me; most out of dislike; some out of fear. Queer incidents occurred—Well, never mind! Enough happened to enable Colonel Pritchler, in his investigation of my childhood,

to realize that I was a mutant, which was more than I ever realized until I was in my twenties."

Toran and Bayta listened distantly. The wash of his voice broke over them, seated on the ground as they were, almost unheeded. The clown—or the Mule—paced before them with little steps, speaking downward to his own folded arms.

"The whole notion of my unusual power seems to have broken on me so slowly, in such sluggish steps. Even toward the end, I couldn't believe it. To me, men's minds are dials, with pointers that indicate the prevailing emotion. It is a poor picture, but how else can I explain it? Slowly, I learned that I could reach into those minds and turn the pointer to the spot I wished, that I could nail it there forever. And then it took even longer to realize that others couldn't.

"But the consciousness of power came, and with it, the desire to make up for the miserable position of my earlier life. Maybe you can understand it. Maybe you can try to understand it. It isn't easy to be a freak—to have a mind and an understanding, and be a freak. Laughter and cruelty! To be different! To be an outsider!

"You've never been through it!"

Magnifico looked up to the sky and teetered on the balls of his feet and reminisced stonily, "But I eventually did learn, and I decided that the Galaxy and I could take turns. Come, they had had their innings, and I had been patient

about it—for twenty-two years. My turn! It would be up to the rest of you to take it! And the odds would be fair enough for the Galaxy. One of me! Trillions of them!"

He paused to glance at Bayta swiftly, "But I had a weakness. I was nothing in myself. If I could gain power, it could only be by means of others. Success came to me through middlemen. Always! It was as Pritchard said. Through a pirate, I obtained my first asteroidal base of operations. Through an industrialist I got my first foothold on a planet. Through a variety of others ending with the warlord of Kalgan, I won Kalgan itself and got a navy. After that, it was the Foundation—and you two come into the story.

"The Foundation," he said, softly, "was the most difficult task I had met. To beat it, I would have to win over, break down, or render useless an extraordinary proportion of its ruling class. I could have done it from scratch—but a short cut was possible, and I looked for it. After all, if a strong man can lift five hundred pounds, it does not mean that he is eager to do so continuously. My emotional control is not an easy task, I prefer not to use it, where not fully necessary. So I accepted allies in my first attack upon the Foundation.

"As my clown, I looked for the agent, or agents, of the Foundation that must inevitably have been sent to Kalgan to investigate my humble self. I know now it was Han Pritchard I was looking for. By a

stroke of fortune, I found you instead. I *am* a telepath, but not a complete one, and, my lady, you were from the Foundation. I was led astray by that. It was not fatal, for Pritchier joined us afterward, but it was the starting point of an error which *was* fatal."

Toran stirred for the first time. He spoke in an outraged tone, "Hold on, now. You mean that when I outfaced that lieutenant on Kalgan with only a stun pistol, and rescued you—that you had emotionally-controlled me into it." He was spluttering, "You mean I've been tampered with all along."

A thin smile played on Magnifico's face, "Why not? You don't think it's likely? Ask yourself then— Would you have risked death for a strange grotesque you had never seen before, if you had been in your right mind? I imagine you were surprised at events in cold after-blood."

"Yes," said Bayta, distantly, "he was. It's quite plain."

"As it was," continued the Mule, "Toran was in no danger. The lieutenant had his own strict instructions to let us go. So the three of us and Pritchier went to the Foundation—and see how my campaign shaped itself instantly. When Pritchier was court-martialed and we were present, I was busy. The military judges of that trial later commended their squadrons in the war. They surrendered rather easily, and my Navy won the battle of Horleggor, and other lesser affairs.

"Through Pritchier, I met Dr. Mis, who brought me a Visi-Sonor, entirely of his own accord, and simplified my task immensely. Only it wasn't *entirely* of his own accord."

Bayta interrupted, "Those concerts! I've been trying to fit them in. Now I see."

"Yes," said Magnifico, "the Visi-Sonor acts as a focusing device. In a way, it is a primitive device for emotional-control in itself. With it, I can handle people in quantity and single people more intensively. The concerts I gave on Terminus before it fell and Haven before *it* fell contributed to the general defeatism. I might have made the crown prince of Neotranor very sick without the Visi-Sonor, but I could not have killed him. You see?"

"But it was Ebling Mis who was my most important find. He might have been—" Magnifico said it with chagrin, then hurried on, "There is a special facet to emotional control you do not know about. Intuition or insight or hunch-tendency, whatever you wish to call it, can be treated as an emotion. At least, I can treat it so. You don't understand it, do you?"

He waited for no negative, "The human mind works at low efficiency. Twenty percent is the figure usually given. When, momentarily, there is a flash of greater power, it is termed a hunch, or insight, or intuition. I found early that I could induce a continual use of high brain-efficiency. It is a killing process for the person affected, but it is useful— The atomic field-depressor which I used in the war

against the Foundation was the result of high-pressuring a Kalgan technician. Again I work through others.

"Ebling Mis was the bull's-eye. His potentialities were high, and I needed him. Even before my war with the Foundation had opened, I had already sent delegates to negotiate with the Empire. It was at that time I began my search for the Second Foundation. Naturally, I didn't find it. Naturally, I knew I must find it—and Ebling Mis was the answer. With his mind at high efficiency, he might possibly have duplicated the work of Hari Seldon.

"Partly, he did. I drove him to the utter limit. The process was ruthless, but had to be completed. He was dying at the end, but he lived—" Again, his chagrin interrupted him, "He *would* have lived long enough. Together, we three could have gone onward to the Second Foundation. It would have been the last battle—but for my mistake."

Toran stirred his voice to hardness, "Why do you stretch it out so? What was your mistake, and . . . and have done with your speech."

"Why, your wife was the mistake. Your wife was an unusual person. I had never met her like before in my life. I . . . I—" Quite suddenly, Magnifico's voice broke. He recovered with difficulty. There was a grimness about him as he continued. "She liked me without my having to juggle her emotions. She was neither repelled by me

nor amused by me. She pitied me. She *liked* me!"

"Don't you understand? Can't you see what that would mean to me? Never before had anyone—Well, I . . . cherished that. My own emotions played me false, though I was master of all others. I stayed out of her mind, you see; I did not tamper with it. I cherished the *natural* feeling too greatly. It was my mistake—the first.

"You, Toran, were under control. You never suspected me; never questioned me; never saw anything peculiar or strange about me. As for instance, when the 'Filian' ship stopped us. They knew our location, by the way, because I was in communication with them, as I've remained in communication with my generals at all times. When they stopped us, I was taken aboard to adjust Han Pritch, who was on it as a prisoner. When I left, he was a colonel, a Mule's man, and in command. The whole procedure was too open even for you, Toran. Yet you accepted my explanation of the matter, which was full of fallacies. See what I mean?"

Toran grimaced, and challenged him, "How did you retain communications with your generals?"

"There was no difficulty to it. Ultra-wave senders are easy to handle and eminently portable. Nor could I be detected in a real sense! Anyone who did catch me in the act, would leave me with a slice gapped out of his memory. It happened, on occasion.

"On Neotrantor, my own foolish emotions betrayed me again. Bayta was not under my control, but even so might never have suspected me if I had kept my head about the crown prince. His intentions towards Bayta—annoyed me. I killed him. It was a foolish gesture. An unobtrusive fight would have served as well.

"And still your suspicions would not have been certainties, if I had stopped Pitcher in his well-intentioned babbling, or paid less attention to Mis and more to you—" He shrugged.

"That's the end of it?" asked Bayta.

"That's the end."

"What now, then?"

"I'll continue with my program. That I'll find another as adequately brained and trained as Ebling Mis in these degenerate days, I doubt. I shall have to search for the Second Foundation otherwise. In a sense you have defeated me."

And now Bayta was upon her feet, triumphant, "In a sense? Only in a sense? We have defeated you *entirely!* All your victories outside the Foundation count for nothing, since the Galaxy is a barbarian vacuum now. The Foundation itself is only a minor victory, since it wasn't meant to stop *your* variety of crisis. It's the Second Foundation you must beat—the *Second Foundation*—and it's the Second Foundation that will defeat you. Your only chance was to locate it and strike it before it was prepared. You won't do that now. Every minute from now on, they will be

THE STRANGEST AUCTION EVER



—In a resort town, out of season, that was full of death and intrigue and sinister plans!

A curio collection, a bunch of keys, and a blue-green cab led The Shadow to one of the most gripping adventures of his career

—THE STARS PROMISE DEATH, in the December issue of

THE SHADOW

AT ALL NEWSSTANDS

readier for you. At this moment, *at this moment*, the machinery may have started. You'll know—when it strikes you, and your short term of power will be over, and you'll be just another strutting conqueror, flashing quickly and meanly across the bloody face of history."

She was breathing hard, nearly gasping in her vehemence, "And we've defeated you, Toran and I. I am satisfied to die."

But the Mule's sad, brown eyes were the sad, brown-loving—eyes of Magnifico, "I won't kill you or your husband. It is, after all, impossible for you two to hurt me further; and killing you won't bring back Ebning Mis. My mistakes were my own, and I take responsibility for them. Your husband and yourself may leave! Go in peace, for the sake of what I call—friendship."

Then, with a sudden touch of pride, "And meanwhile I am still the Mule, the most powerful man in the Galaxy. I shall *still* defeat the

Second Foundation."

And Bayta shot her last arrow with a firm, calm certitude, "You won't! I have faith in the wisdom of Seldon yet. You shall be the last ruler of your dynasty, as well as the first."

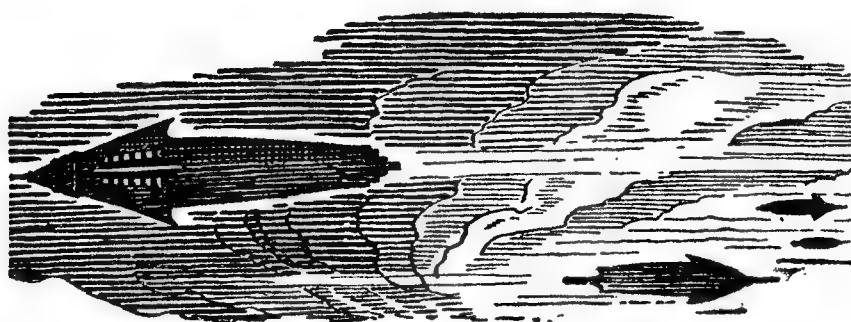
Something caught Magnifico, "Of my dynasty? Yes, I had thought of that, often. That I might establish a dynasty. That I might have a suitable consort."

Bayta suddenly caught the meaning of the look in his eyes and froze horribly.

Magnifico shook his head, "I sense your revulsion, but that's silly. If things were otherwise, I could make you happy very easily. It would be an artificial ecstasy, but there would be no difference between it and the genuine emotion. But things are not otherwise. I call myself the Mule—but not because of my strength—obviously—"

He left them, never looking back.

THE END.





Brass Tacks

The newer "Mother Goose" will probably start with "A is for Atom—"

Dear Mr. Campbell:

The August Astounding with "World of Å" came recently and I picked up Van Vogt's 550 volt A.C. power line, as you put it, and I couldn't let it go until the juice was turned off on page 178. I know know Van Vogt is an excellent writer, but I suspect that fifty percent of the reason I couldn't put the story down was due to a hypnotic suggestion which you planted in my subconscious in the June issue. "In Times to Come" carried your statement, "you can't let go of it." I believed you. Before I even started reading "World of Å" I found myself thinking, "I can't stop reading it. I can't stop reading it."

Whether you know it or not, Mr. Campbell, you have a good psychological weapon for getting reader interest in a story—or the whole magazine for that matter.

But I know I would have liked

"World of Å" even if you had said nothing. I believe Van Vogt is way up there at the top among your best writers if not *the* best. I don't instinctively like every piece that Van Vogt puts out, but if he writes on a subject that interests me I know the story will have a very powerful effect.

The illustrations for "World of Å" were the only good ones in the whole magazine. The rest were poor; Kramer's drawings for "Pipeline to Pluto" were pretty sloppy and sketchy.

I was really downhearted when you wrote me of the tragic ending of Probability Zero. Beside the fact that I was trying to get piece published there, I loved to read it.

As I write this now I can see from here the headlines of the Tucson paper announcing the unleashing of the new "Atomic Bomb" which was dropped on Hiroshima on Western Honshu. The article states that nothing much is left of the city or its three hundred eighteen thousand inhabitants.

One bomb is supposed to be equal in destructive power to two thousand B-29 loads of TNT, and the total explosive charge is, at its biggest, the size of a golf ball; the rest of the bomb is apparatus for detonating it. Nothing is said about the nature of the charge, but here and there uranium is mentioned.

All I know about it is what I read in the papers. When more facts are released, what I have said above may turn out to be false and extravagant.

The newspapers print a lot and say nothing and make the whole thing seem very mysterious. Of course, atomic bombs are old stuff to Astounding fans and I'm willing to bet that the average science enthusiast who has made any study at all of atomic physics really knows a lot more about these bombs and their operation than he thinks he does, but officials won't admit it.

I'm looking forward to Astounding for the first really informative article on this "new" "secret" weapon, and when the cloud of secrecy is removed, it probably won't be so mysterious after all.—William Vietinghoff, 526 S. Roskrue Avenue, Tucson, Arizona.

Foreword—if men will learn not to use Atoms for weapons!

To The Editor:

The official revelation that Atomic Energy is at last a practical reality vividly demonstrates the value of science-fiction beyond mere "escape" reading.

For who can be better prepared than science-fiction readers for the discovery, or more aware of the social and scientific significance of the Atomic Age now upon us?

Far removed from that category of unprofitable fantasy into which it is so often placed, science-fiction is much more even than a leisure-hour pastime for the technically inclined from the layman to the scientist: it is an education of a public for a future which is now, as it has always been, amazing to consider.

And even those who are most skeptical of this have been shattered and rocked on their foundations like Hiroshima, and must make an admission—an admission of more than the value of science-fiction: a realization, indeed, of the inevitability of man's progress.

What the skeptic will probably never acquire, and much he will suffer instead, is a confidence that this future will be for the better.

For, despite the fact that the "Atomic Bomb" could very easily wipe out civilization—the public has only just discovered what ASF readers have known for years—I for one cannot help having an exhilarating feeling that it is a tremendous step for the betterment of mankind.

A deep insight into the future and the ways of progress, an introduction to an understanding of concepts and worlds in the outer reaches of man's imagination—these are the offerings of great science-fiction.

The most astounding story you

will ever print will not be fiction but the awesome fact that the one big step separating our civilization, our times, from some of the most fantastic prospects ever contemplated by man—finding the key to Atomic Energy—has been taken.

And this story will be incontrovertible proof of the value of science-fiction.—J. M. B. Churchill, Jr., 20 Chapel Street, Brookline 46, Massachusetts.

Personally, I think you are over-conservative. I'd say we should reach the Moon by 1950.

Dear Mr. Campbell:

Science-fiction has hit it on the nose again. When the announcement came over the radio last night, I was as surprised as my parents who definitely are not fans of your magazine. After the initial shock the first thing I thought was, "We'll be on the Moon before '60." The second thing was "Solution Unsatisfactory." Actual events are too blame close to agreement to that story to suit me. If I remember right no one could supply a better answer to the question than the one in the story and it doesn't seem that that one is likely to come into use.

The announcement of atomic power, which brings into dramatic truth so many of the dreams of science-fiction, was the thing that jogged me loose from my long silence but as long as I have started the letter I may as well tear the past issue into shreds.

1. "Into Thy Hands"—Lester del Rey. This is not the best piece of work by del Rey, by any means. It is light-years behind "The Day Is Done" or "Wings of Night," but still it is a capable work. The ending was a trifle hazy, since I couldn't exactly fit the time element in, but the mood was excellent.

2. "Paradoxical Escape"—Isaac Azimov. The humor was excellent. I still can't see how the author can get so many plots out of merely three little rules. The characters were poorly drawn. Despite the fact that I have met them before I could not always keep them separate. It is well for the authors to remember that there are many readers that merely skim a story and have a hard time following a dozen characters in a short. It improved with rereading.—B.

3. "Gift Horse"—Ross Rocklynne. I liked the idea and the style of writing. However, I never did quite get the solution. Maybe I'm dumb, but too many of these stories seem to lack clarity.—B.

4. "The World of A"—A. E. Van Vogt. After reading this I went back and reread for the dozenth time "Slan." How the mighty have fallen. There was no comparison between the clear-cut action of "Slan" and the complexity of this story. With the exception of "Asylum" and "The Weapon Shop," Van Vogt hasn't written an A class story since 1940.—C.

5. "Pipeline to Pluto"—Murray Leinster. This was the clearest story in the issue, but it lacked purpose.—C.

As a whole the issue was good. There were no outstanding stories in either direction. The illustrations were poor. It will be a good thing when we can once again have Rogers' covers and Schneeman as work artist. Orban's work is acceptable and Kramer's was better than his average.

Before I leave you I'll put in my personal selections for the best stories since the middle of '37.

1. "Final Blackout"—Hubbard.
2. "Slan"—Van Vogt.
3. "Who Goes There?"—Stuart.
4. "Greater than Gods"—Moore.
5. "Clash by Night"—O'Donnell.
6. "Roads Must Roll"—Heinlein.
7. "Admiral's Inspection"—Jameson.
8. "Asylum"—Van Vogt.
9. "Blowsups Happen"—Heinlein.
10. "The Master Shall Not Die"—Miller.

Below third place the choices are as close as the distinction between Watson and Henderson, but the first three are out and away in the lead. The thing that tells the quality of the stories in this magabine is not so much the ones that are on but the ones that are left off.—James Bourne.

The highest frequencies recorded on records run about 15,000 cycles. Television requires at least 4,000,000 cycles per second!

Dear Campbell:

I have just finished reading a popular article in the *Toronto Star*

Weekly on John Logie Baird. One paragraph interested me vastly as recently I wrote a pseudo-scientific article for one of the west coast fanzines in which I discussed recording television or any motion picture on disks and went into details on how I thought it might be done.

Anyway, in this article on Baird, this paragraph said that in 1928, in London, Baird, while working on his early television experiments, stumbled, by accident on "Phonovision." The paragraph went on to say that if a television transmitter is coupled to a loud-speaker —through a receiver I presume— sounds are heard. If these sounds are recorded, and then played back through a television receiver—the article said screen, but I take this to infer the use of a complete receiver—the original picture is reproduced.

I was wondering what you thought of this.

The thought also struck me that if this is possible, and I think it is, and it was developed, might it not be possible that some day we could buy movies, not on the present day film, but on disks, like phonograph records, only, perhaps, made of some more substantial material? Might it not be possible these disks would in time replace the present method of motion picture films?

Naturally, some other thoughts pop up, as I am trying this: the material used would have to be perfect from the standpoint of "surface noise." Surface noise in the modern record is known as needle

scratch. In radio transcriptions this is reduced to almost the vanishing point. But in such "phonovision," what would it do to the picture? Would it be marred by "static" as television is at times by ignition interference? Bright flashes, streaks, spots, and so forth flicking across the screen

Another thing: as television takes in such a broad range of frequencies, at what speed would such a disk have to run to allow of perfect recording and reproduction? Wouldn't it have to be many times the standard 33 1/3—for radio transcriptions—and 78 rpm—for the regular disk? Would the land between the grove have to be wider to permit of higher percentages of modulation of the grove and yet prevent overcutting? Mightn't it be better to not use lateral cutting, but use vertical, or hill and dale, method?

This is, naturally, all in the order of theorizing, but I think there is some basis in it, don't you?—Leslie A. Crutch, Box 121, Parry Sound, Ontario, Canada.

First sale of Astounding on the Moon by 1955. I'm betting!

Dear Mr. Campbell:

It might be of some interest to you to know of the popularity of your magazine in such a far off place as Australia. (Sorry, it has no popularity in the Philippines, because it just isn't available!)

On the last Friday of each month,

in the West Australian city of Perth, about seventy-five copies of your magazine are distributed to the three or four major book shops. (The rest can't get them at all.) Before Friday evening, none are left, which is only natural.

Furthermore, when the magazine reaches Australia, it has gone through England, where, as you know, it is reprinted entirely, leaving out all illustrations, and ending up with about the thickness of the *Liberty* magazine. By the time it gets to Australia, it is about four or five months old. But it's news to us!

The biggest market for your magazine, though, is in the second-hand bookstores. Here, it brings three times its new price, even though I think I remember seeing various SF magazines as old as 1933! And don't think it's easy to buy one of these fifteen-year-old magazines, either! Like cigarettes, you have to be a personal friend of the management.

That's why I've just subscribed to your magazine—I am too far away from Australia to be friendly with the management!—Norman E. Cook, RM1c.

The Atomic Bomb does use Solar Power!

Dear Mr. Campbell:

This atomic bomb business ties in amazingly well with a remark I made on page 126 in my article "Prominences."

In discussing theories to account

for high ionization in the corona I said that the "East Indian physicist, Saha, who in 1920 at one stroke gave us a complete explanation of conditions in the chromosphere, has advanced a theory based upon results observed when uranium is bombarded by neutrons."

To be precise, here is what Saha said (*The Observatory*, February 1945, page 20):

"I believe it to be more likely that some process occurs near the Sun's surface which is akin to uranium fission, discovered by Hahn and Strassemann in 1939, and discussed by Bohr and Wheeler. In the laboratory experiments on this phenomenon it is found that neutron bombardment of the uranium nucleus may result in a reaction of the type



where $M_1 + M_2 = 236 - Z$; $x + y = 92$; $Q = 200,000,000$ electron volts (!); and Z is the number of neutrons evaporated."

Of course, U^{235} we now know is the element that splits into barium and presumably krypton with enormous evolution of energy.

When President Truman said that the atomic bomb derives its enormous energy from the same source that keeps the sun shining, I doubt whether he had this in mind, but the remark is certainly suggestive.—Robert S. Richardson, 813 Santa Barbara Street, Pasadena 4, California.

I'll bet you'll soon be deluged by

stories in which mad scientists blow up the world by atomic fission.

We are printing one part of the Smyth report—but every reader of this magazine should, somehow, buy a copy of that report. It is the most important document in human history.

Dear Mr. Campbell:

Now that the news has broken on Oak Ridge, it is possible for me to write you and ask several questions without getting tangled up with Security regulations.

In what issues of Astounding did you print the stories "Blowups Happen" and one called, I think, "Nerves?"

And do you know of any place where I might be able to get hold of these back copies? I used to have them, but when one has moved around the country as much as I have in the past several years. . . .

I don't know if you had any of your regular writers working in connection with the Project—I do know that you had a large number of your regular readers. In this section, Astounding outsold all other science-fiction magazines by a ratio of about 5 to 1, and for good reason.

One of the most interesting documents of recent times is the Smyth report, excerpts of which have appeared in some of the newspapers. You ought to be able to get hold of it; but from whom I do not know. If you could get it and print parts



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or all of it, which might be possible, I know that it as a factual account of the development of the atomic bomb should certainly be as interesting as the earlier fictional accounts of the same thing. Most of the fiction seems pretty dull and unimaginative now, doesn't it? And how many years will it be before interplanetary travel is feasible?

If you desire to print this letter, you may, but please withhold my name.—Clinton Engineer Works, Tennessee Eastman Corporation, Oak Ridge, Tennessee.

Theodore Sturgeon,
Apt. 5A, 151 8th Ave.,
New York 11, N. Y.

AUGUST SIXTH
1945

(There is music; it is Sibelius and Bach, it is richness and exactitude, a rushing bass and a wrenching treble, the bass aimed for the belly and the treble for the tearducts . . .)

There is a man asleep. He walks and moves and builds but he is asleep. His eyes are closed because he is asleep. He does not know how big he is because he is asleep. He is made of scar tissue.

There are voices. They are all his voice. The places where the voices are heard are all here where he is.)

Magazine Store:

Who buys this crap?

That kind of thing is ridiculous.

Just to settle it for once and for all, where would they get the power? (The echo begins. It whispers "power power power" until the whisper is a sheet, a screen, a thing all one color getting brighter. It never stops again. It gets behind the music and brings the music forward.)

School:

I am trying to be reasonable about this, children. I must make you understand that it harms you to escape into such tripe. Confining yourself to the books I give you. You must not clutter up your minds with such impossible nonsense.

Home:

Pulp magazines again! Must you read stories

About rockets

About space flight

About space warps

About new sociologies

Silly! Where would they get the power?

(The echo deepens)

Cemetery:

. . . to finally prove the impossibility of the railroad's replacing the canal. How can you expect the smooth wheels of a locomotive resting with only the locomotive's weight on a smooth track—only one point for each wheel, gentlemen—to yield traction enough to move a train? Who wants a means of transportation which would prohibit a man's using his own carriage as he now may use his own canal boat?

. . . these dreamers who want

to build flying machines heavier than the air that supports them have not faced the issue. What would be the status of shipping today if ships depended upon their engines, not only to drive them, but to keep them afloat?

(From somewhere, the fingers of Langley, Lilienthal, Stephenson, Fulton touch the man's sealed eyelids. He rubs them, and rubs again, and finds that scars have not covered his eyes. He is afraid and keeps them closed.)

Newstand:

Who writes this crap?

Places with typewriters:

I wrote a story about decentralization, because cities could not dare exist when each city had bombs that . . .

I wrote a story about a meteor detector that worked controls when it received the reflection of a radio signal . . .

I wrote a story about a reaction engine . . .

I wrote a story about a rocket projectile . . .

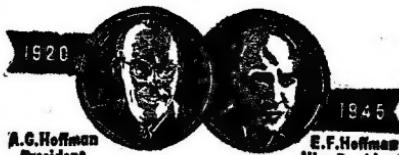
I wrote a story about a robot flying bomb . . .

Subway:

The heck with that stuff. I druther read stories about real life. I druther read something that has to do with me.

Place with a typewriter:

I am afraid. I tell you that deep down inside I have a cold lump about this thing. I know we must be doing something about it because although it is old stuff to us have been asked not to mention



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it in our stories for security reasons. It is too big for us. It can be good—it can give us power so cheap it would be free. It can give us a four-day work week, five hours a day. It can give us riches. But we are not old enough for it yet. I pray God that it will be discovered and used before this war is finished, so that everyone will know how big it is, how good, how horrible.

Atomic power

(The "atomic" finds its place in the echo, in the interstices between "power power power" and gives a staccato tone to the sheet of sound. The man's eyes open a crack and now he sees, but he sees death, because death came to stand before him when his eyes opened. He is afraid and tries to close them but a whisper, a transparent whisper, creeps between his eyelids and holds them open.)

Whisper :

On December 7, 1944, the newspaper said there was no bombing activity over Japan. Somewhere else the newspaper said there was a small B-29 reconnaissance flight off the Japanese coast, just where the Japan deep is. The Japanese islands sit on the edge of the Japan deep, like houses on the edge of a cliff. Somewhere else the newspaper said there was quite an earthquake that day. That day was December 7th, December 7th. Remember?

(The whisper slips away to the figure of death, and the man who

can see now realizes that death is transparent like the whisper, and through death he can see how big he is. He stretches his body and feels how strong he is. He opens his eyes a little more.)

Radio :

The president says that the bomb that struck Hiroshima on August 6, 1945 was atomic. The president does not call it atomic explosive. The president calls it atomic power.

(The echo is greater than the music now; greater than anything else but the man now.)

Places with typewriters :

We are writing stories about the future

About machines that can think creatively

About interstellar flight

About the psychological fulfillment of mankind

About mutations caused by hard radiation from atomic bombs

About empathy, second-order space, contra-terrene matter, levitation, astral separation, telepathy, the intuitive mutation, universal syntheses, time-travel, silicon life, and the evolution of intelligence in rats.

Street corner :

Why do you read that crap?

(But the man with the open eyes does not hear that. He is looking at himself, on the other side of death. He knows—he learned on August 6, 1945, that he alone is big enough to kill himself, or to live forever.)

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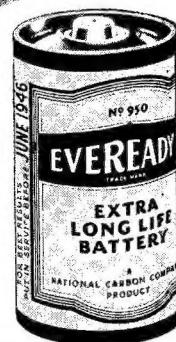
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